

Cleric Society

Philosophia Sacra :
Jacob — OR, THE *Tattonson*
PRINCIPLES
OF
Natural Philosophy.

Extracted from

DIVINE REVELATION.

By SAMUEL PIKE. *R*

*The works of the LORD are great, sought out
of all them that have pleasure therein.*

PSAL. CXI. 2.



L O N D O N :

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From the Editor

DIAINE REINTEGRATION



Morgan

In the year of our Lord one thousand seven hundred and twenty five, in the month of November, the day of All Saints, in the year of the Incarnation of our Saviour Christ one thousand seven hundred and twenty five, in the reign of King George the Third, the third year of his reign, in the city of London, at the house of Mr. John Murray, publisher in Pall Mall, by J. Backhouse.

P R E F A C E.

TH E author of this treatise was, not long since, very averse from thinking that the holy scriptures contain'd any thing like a system of the principles of true philosophy ; and look'd upon those places of scripture which at first sight contradicted the sentiments of the present philosophers as express'd by way of allusion and accommodation to bare outward appearances. He being educated in the system of philosophy, that is now generally embraced by the learned world, was strongly attached to it, highly delighted with it, and received it in all its parts, without any abatement, as the only true system, and was satisfied with it. But upon a serious recollection, found himself embarrassed with some difficulties he could not easily remove. This put him upon a fresh enquiry, and he was at length prevail'd upon seriously to ask this question in his own mind, *Does revelation speak exactly and philosophically true in natural things?* At his first setting forward to answer this question, he had all those objections in his

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mind, which are generally made against scripture-philosophy; and could not be perswaded to believe that revelation was intended to contain philosophy in it, until he had actually found it there, to his great pleasure and satisfaction. As he proceeded in this search, he felt the extreme force and influence of Prejudice; and for this reason, cannot but suppose that the same prejudices will arise in the minds of others who have had the same education. This he looks upon as a necessary consequence of such an education, rather than any fault in those that have been thus instructed. And therefore accounts himself as under peculiar obligations to make allowance for this influence in others, because of what he has felt in his own mind.

But having at length finished the laborious search, he at once saw all the philosophical expressions of revelation clearly to coincide, and unite in one and the same uniform plan. Now the philosophical principles of revelation appear'd perfectly rational, truly intelligible, entirely consistent, and properly sufficient to account for all the grand phænomena of nature. The consequence of this enquiry is here presented to view with the evidence both scriptural and rational upon which it is founded.

The very nature of the subject requires an attentive and repeated perusal: and therefore the treatise should not be just read once over, as many books are, and then laid aside: but ought to be review'd again and again, in order to familiarize the scheme to the mind, to compare the

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the several parts of it together, and see how they all harmonize with and corroborate each other. The original likewise should be consulted by those who are qualified to do it; and the strict, literal and exact meaning of the original words closely attended to. Upon the whole, no person whether learned or unlearned, can expect to have a full view of the principles of nature, and the manner of their operation, without using thought and taking pains.

'Tis true, that the author has not taken the usual method, in explaining scripture-words and phrases; but surely he may be vindicated herein, from this consideration: He was in pursuit of *philosophy*, and was therefore obliged to understand and explain philosophical words and phrases, not in an allegorical, allusive or metaphorical sense; but in a strictly natural, literal and philosophical sense. This is the only fundamental difference between the usual method and that which is here taken. Whoever therefore desires to see the scripture evidence, should endeavour to cast aside those interpretations in this case, that are in their own nature allusive and allegorical, however obvious and natural they may seem, and see whether the strict literal sense be not philosophical and just; and if it be, no person can rationally prefer a figurative to a literal exposition.

The style of this treatise is plain and intelligible; the whole being express'd in language as clear as the nature of the thing will admit. The author has affected plainness, as knowing that

if hereby he may give some light to the unlearned, those of superior capacities and acquirements can be at no loss. And altho' those alone who understand the original language can pass a proper judgment upon the whole of the evidence; yet 'tis very desirable that the unlearn'd christian should be admitted into the subject as far as may be, since it respects the excellency and usefulness of that book, from whence he derives all his knowledge as a christian. Tho' the learned only can consult the original, yet others may in several respects be capable to judge of the consistency of the plan with its self, together with its suitableness and sufficiency to account for the various facts and appearances in nature they may be conversant with: yea, and many particulars of the scripture evidence may be visible to one, who attentively looks into it, tho' he be a stranger at present to the original Hebrew.

It must be acknowledged indeed, that some persons, both learned and unlearned, will peruse this treatise to disadvantage; because they are fix'd and rooted in sentiments directly opposite to what are here proposed to consideration. Some learned philosophers, who pass a right judgment of the phænomena of nature, will find it as difficult as the author himself did, to reconcile their minds to this method of explaining and interpreting scripture; because they have been accustom'd to figurative and allegorical interpretations of philosophical texts, and will therefore, at first sight, account the figurative interpretation the most natural and obvious,

vious, tho' it be in its nature the most improper; and will be inclin'd to esteem the literal explication the most strain'd and unnatural, altho' it be in itself the most proper and exact. And until the influence of such a contracted habit be somewhat abated, the evidence will not be so easily seen or readily receiv'd as it ought to be.

Some unlearned christians on the contrary may be inclin'd to object to the whole, because of the false apprehensions they have concerning philosophy it self: for such have been used, from the evidence of sense and from the language of scripture, according to its present translation, to apprehend that the body of the sun moves, and that the ball of the earth is immoveably fix'd. But let them be assured, that the reverse of this is undoubtedly fact, as may be and has been proved by the learned upon the most indubitable principles, and with most certain and conclusive arguments.

This whole performance contains no censorious reflections upon the present philosophers, but freely gives them that honour and respect that is their due; because of their great learning, remarkable ingenuity, indefatigable industry, and the pleasing success that has attended their laborious enquiries into nature.

And the philosophy itself of the present age is contradicted but in a very few particulars; while the chief aim and design of this treatise is not to oppose, but to improve upon what has been already investigated by the peculiar application

cation of the learned. It does not set aside what they have established, but only explains what they have left unexplain'd. They have investigated the *rules* according to which nature operates; while this treatise attempts from divine revelation, to assign the natural *cause*.

The most learned and ingenuous of the present philosophers, confess themselves unable to exhibit the natural cause of *gravitation*, *cohesion*, *magnetism*, and *electricity*, without ascribing such properties to dead matter, as cannot belong to its nature. Surely then, an attempt to explain the causes of these appearances from revelation, in an intelligible and mechanical way, cannot be justly call'd an opposition to the philosophy of the age; but rather an agreement with it and an improvement upon it.

Whether the treatise will be read with applause or contempt; whether it will be embraced or rejected, the author desires to leave in the hands of that God whose word he searches and loves, whose works he admires, and whose glory he aims to display. If by means of this plain attempt, any are brought to a farther admiration of the divine works, a greater reverence of the divine name, and a stronger attachment to and clearer knowledge of the divine revelation, the great end that the author has in view will be answer'd: and because he has arrived at such a clear satisfaction himself, he therefore hopes that the treatise, however imperfect, may be a means of promoting the knowledge of divine revelation, a steadiness of faith in

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in it, and an increasing esteem of it. The hope of being in some measure capable this way, to advance the divine glory, and to serve his generation, is what excites him to, and therefore vindicates him in the publication of it.

One thing must now be requested of the reader, and 'tis but reasonable to expect it; nay 'twould be just to insist upon it; and that is, that he should peruse the whole with the same spirit of candor, impartiality and serious enquiry, with which it is compiled and penn'd.

*q's day before last 26th att Boston
by the author to his friend Mr. John
Bull, who has given me leave to publish
it at his expence. I have done so, but to avoid
any confusion know stony brook to be
the author of this treatise.*

The whole treatise is written in english, and in the plainest manner, for the sake of the english reader: while the references to the original Hebrew are made in such a way, as to direct the learned reader to the original word, without mistake, because there is one method invariably pursued in these quotations. This uniform method is express'd in the following plan: the *first* column contains the Hebrew letters themselves, the *second*, the names by which they are usually call'd, the *third*, sets forth the English letters that constantly answer to the Hebrew ones, in the quotations of this treatise.

P R E F A C E.

א	Aleph	A, E.
ב	Beth	B.
ג	Gimel	G.
ד	Daleth	D.
ה	He	H.
ו	Vau	U, V, O.
ז	Zain	Z.
ח	Cheth	'H.
ט	Teth	T.
י	Jod	J, Y.
כ	Caph	C, CH.
ל	Lamed	L.
מ	Mem	M.
נ	Nun	N.
ס	Samech	S.
ע	Gnain	NG.
פ	Phe	PH.
צ	Tsade	TS.
ק	Koph	K.
ר	Resh	R.
ש	Shin	SH.
ת	Thau	TH.

R E M A R K S.

א Is supposed by some to have no sound of itself, and only expresses the opening of the lips, and is therefore to be pronounc'd according to the vowel that belongs to it, and for that reason 'tis in this treatise express'd sometimes by A sometimes by E.

† When it is a consonant, is written V; when it is by the points made a *Surek*, 'tis written U; when a *Cholem*, 'tis written O.

ת Is

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¶ Is usually supposed to be a double H, upon which account the Greek aspirate is join'd with it, thus 'H, to distinguish it from the single H, or ¶.

' When a vowel, sounds I; when a consonant sounds Y.

Thus all the Hebrew letters are express'd by large capitals in English, while the vowel points are conform'd to as much as the English vowels will admit, being express'd by the little letters a, e, i, o, u. So that wherever the reader sees a large capital letter, in a reference to the original, he may be certain there is in that place, that Hebrew letter which answers to it, according to this plan. And wherever he sees a small vowel written, he may be certain, there is not a Hebrew letter, but some corresponding vowel-point.

C O N.

БОЛДИН

en. Il réussit à débrouiller
les choses et obtient la libération de son père.

10 AP60

10 AP60

This is a copy of a letter from Mr. John C. Frémont to General W. T. Sherman.

1900. 10. 10. 11. 12. 13. 14. 15. 16. 17. 18. 19. 20. 21. 22. 23. 24. 25. 26. 27. 28. 29. 30. 31.

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einfachen verzierten steinernen treppenstiege.

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CHAPTER II *Concerning the effects produced by*

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P H I.

PHILOSOPHIA SACRA, &c.

C H A P. I.

Concerning Scripture Philosophy in general.

TH E subject before us is of such an interesting nature, that it does in some measure affect all those that have the word of God in their hands. The learn'd and unlearn'd, the christian and philosopher are all concerned with it. As for common christians, 'tis well known, that they are very much prejudiced against several parts of true philosophy, merely because they cannot reconcile the sentiments of the learned world with the direct expreſſions of sacred scripture. For this reason it is, that many ſerious christians account themſelves bound to disbelieve, and oppose the philosopher, particularly when he afferts the motion of the earth round its own axis and round the sun. From whence, 'tis evident, that many true believers of revelation look on themſelves

2 *Philosophia Sacra: Or,*

selves as bound in conscience to believe what scripture asserts, not only in spiritual, but likewise in *natural* things.

On the other hand, the deistical philosopher despises the bible, and confirms himself in his denial of its divinity and veracity, because it apparently contradicts what his learning assures him to be true philosophy. The learned christian, generally takes a middle way; and thinks that his bible was never intended to teach him philosophy, and that therefore its expressions in natural things are accommodated to vulgar apprehension or outward appearances. Surely now, 'tis worth while for us to see which of these sentiments are just and true, whether those of the common christian or those of the learned christian, or those of the deistical philosopher, or indeed whether the opinions of either of them are right. And so this great question arises, *whether sacred scripture speaks exactly and philosophically true in natural things, or no?* Certainly the true christian, that justly puts the highest value upon his bible, can have no objection against determining this question in the affirmative; while the deistical philosopher ought to admit it, if it appears with proper evidence.

'Tis indeed readily granted, that the traces of true philosophy are not to be found in scripture according to the present translation, or according to the usual method of interpreting

preting it. But yet, 'tis equally plain, that a vast number of passages occur in sacred writ, which seem intended to give a just account of natural things.

The allusions made in scripture to nature are exceedingly frequent, and the passages are very numerous, which seem to have no other immediate design than to state an account of natural things with exactness. These places of scripture need not be mention'd here, since you will find abundance of them in the following treatise. And many of these texts don't appear to accommodate themselves to vulgar apprehension, nor can they be explained by outward appearances.

The true intention therefore of the following thoughts, is to set this matter in a fair light, and to see what system of philosophy the scripture does in fact contain. It does indeed give me some uneasiness to find that I am obliged to make so many alterations in the translation of the bible; because it may be interpreted as a tacit reflection upon the translators: but I desire no such use may be made of it by any. I am well persuad-ed, they were persons of great integrity, piety and learning; for they have given us the strongest evidences of their diligence and faithfulness in executing that great and valuable work: but must it not be acknowledg-ed, that they set out in their work, not in search after *philosophy*, but after *divinity*?

4 *Philosophia Sacra: Or,*

In this search, they very happily succeeded : but as they had no expectation of finding the first principles of nature in the Bible, they did not therefore bind their thoughts that way. Either this was the case with them, or they set out with false principles of philosophy in their minds. 'Tis no wonder then, if in these respects the translation should be found to be imperfect. For there is no doubt to be made, but that had they set forward with an apprehension of finding the secrets of nature explained, they would have given a more exact and literal translation to many passages, than they have.

'Tis very probable likewise, that several who take this treatise in hand, may have their expectations of this nature very low ; and may be inclin'd to pronounce at once, that this attempt is weak and vain. However, let me prevail upon the reader, to join with me in reviewing attentively this part of sacred writ ; that we may see plainly, what can be made of it, and what can be learn'd from it, upon an exact and literal translation, with a plain and natural interpretation. And, in order to encourage the reader to give a serious attention, I will here freely tell him, what pains were taken, and what method was pursued by me to bring this little treatise to light.

First : the scriptures were read all over from the beginning to the end ; with an entire

tire uncertainty of mind, whether they were written upon the principles of true philosophy or no; but with a desire, and indeed a resolution (if possible) to determine this question. While the scriptures were review'd with this intention, all the passages that at first sight look'd to be of a philosophical nature, were noted down. In making this collection of scriptures, some attention was given all along, that no proper passages should be omitted: tho', doubtless, among such a great number of texts, some *proper* ones were, tho' undesignedly, passed over; while, it may be, many *improper* ones may have been taken notice of.

In the next place, all these texts of scripture were particularly and attentively look'd into; the original consulted, and a literal translation given: and there was as much care taken, as lay in my power, that no one word should have any strain or force put upon it, and that the exact natural idea should be given in the translation. When all this was done, the mind was still in some suspense: but to bring the whole into a certainty, the several texts which spoke expressly and philosophically of the heavens and the earth were sorted. The passages that speak of the heavens and skies were found to be very numerous; and therefore, in order to methodize them, it seem'd proper to put and answer such enquiries as these: what effects

6 *Philosophia Sacra: Or,*

are ascribed to the heavens? what properties are attributed to them? what are the parts of which the heavens are composed? and how do these parts operate on one another and upon the earth? These questions were put, and the answers received merely from revelation: and I can safely say, that 'tis in this way *alone* the following scheme was composed.

Now, if upon such a diligent, and I hope faithful search, it be found, that no one philosophical passage is contrary to philosophical fact; then the scripture is plainly vindicated from that reflection which is cast upon it, as if it spoke false in natural things. And farther, if it appears, that these numerous quotations from scripture do actually exhibit the principles of natural philosophy, do really assign the true causes of motion in nature, and give us a clue to philosophize upon with safety and success; all these things unite to confirm the divine authority of scripture: Then its allusions to nature will be seen to be exceedingly beautiful; and many spiritual truths will be illustrated. And surely all this must be very desireable to those who love the word of God.

The occasion which excited my mind at first to these enquiries was as follows. Tho' ~~done~~ more readily received, or was more highly delighted with the present system of philosophy than myself; yet upon a more narrow

narrow inspection, there appear'd a very important defect in it: which was this. If any enquire why it is that the heav'nly bodies (the planets) tend towards the sun, and why our bodies tend towards the earth? The answer is, that all matter has in it a principle of attraction or gravitation, which operates according to such and such laws. But what is the cause of this gravitation the philosophers either cannot explain at all, or are very much disagreed in the explication. The great Sir Isaac Newton himself, and other ingenious authors after him, have attempted to give an intelligible account of the cause of gravitation, by supposing nature to be fill'd with particles of matter that are in themselves either repulsive or elastic. But still, how it is possible for particles of matter to have in themselves these properties, is professedly unknown. Whereas reason and nature tell us, that each atom of matter is in itself dead and unactive, incapable of moving itself, and uncapable of being moved but by contact, and much more incapable to produce motion in any other matter. I cannot but reason thus; if the influence or operation of nature be *material*, it must be *mechanical*, and if mechanical it must be *by contact*. If there be any influence or operation that is not *material*, it must be *spiritual*; and if it be spiritual, it cannot belong to *matter as*

B 4 *such,*

such, but must be something superadded to it. This spiritual agency then, must have a spiritual agent to produce the effect: and now we are got beyond our reach, and can be no longer said to philosophize, but to speak of things we know nothing of. Much more may be said on this subject, but I am unwilling to tire out the common reader, with what I am afraid he will not be able clearly to understand.

Thus finding myself and them at an entire loss, concerning the cause and continuance of motion in nature, I was induced to a farther search. And where should we go when reason fails, but to revelation. By this, we are directed to turn our eyes and thoughts to the material heav'ns. Here we have the powers, properties and constituent parts of the heav'ns revealed: here we are taught the manner in which the heav'ns operate upon themselves, and upon all other matter; here likewise we are taught to conceive of all natural causes and effects as mechanical; and thus are freed from any perplexities about hidden qualities; and a large field is set open for the most pleasant, curious and profitable enquiries.

The following collection was not designed to include all the expressions of scripture that refer our thoughts to natural things, which are indeed almost innumerable:

ble: but it is very much confined to what is said of the *heav'ns* and *earth* in general. And since scripture expressions and allusions have been acknowledged to be philosophically just and true in all other particulars; therefore a more extensive review may be judged the less necessary. And permit me to draw this one conclusion: that, if upon a fair search, it appears that revelation gives us an exact, instructive and noble account of the *heav'ns* and *earth*, it will follow that *all* scripture expressions of and allusions to natural things, without exception, may be firmly depended upon.

I cannot well conclude this chapter, without taking some notice of the objections that are usually rais'd and started against the supposition of the scripture's speaking strictly true in philosophical matters. Now I conceive that the first and greatest objection is this: that in fact revelation does not give us a true account of nature. And if this objection be valid, I am very ready to give up the whole scheme, as soon as that be made to appear. But is it not well known, that the principles of natural philosophy have been in continual flux; one age embracing one scheme, and another age a contrary scheme? and is there any absolute dependence upon human reason in this affair? Why should we not be ready then to recur

to

to revelation, and see whether it be true or false in its account of natural things.

But it is farther objected, that 'tis quite needless to suppose that revelation should give us a system of natural philosophy, since it was never intended to instruct us in such matters as these. Its design was to lead us into the knowledge of God and of things divine; and if it answers this end, 'tis sufficient to establish its veracity, and to display its excellency.

To this it may easily be replied. Will any one say, that there is nothing but pure *divinity* in the bible? Is it not confess, that there is a great deal of *geography*, of authentic *history* and *chronology* in the word of God, 'Tis true, the history and chronology of the bible is introduced in subserviency to the divinity of it: and must not the same be said concerning philosophy? What tho' it be not its primary design to give us the knowledge of nature, yet it may be a secondary design; in order to subserve the purposes of spiritual knowledge.

But it is farther urged, that the language of revelation is quite contradictory to true philosophy, and that it evidently appears to be accommodated to the conceptions and apprehensions of the vulgar. The scripture speaks of the sun's rising and setting, and of its going from one end of the heav'n to the other;

The Philosophy of Revelation. 11

other: it speaks of the earth's being fix'd, and of its pillars and foundations; in all which it seems plain that revelation describes these things according to outward appearance: whereas true philosophy teaches us, that the sun does not go round the earth; but that the earth revolves round the sun once a year, and round its own axis once a day.

'Tis confess'd that this is the strongest objection of all; and if valid, would overturn the whole of this attempt. The only answer I shall give to it in this place is, that all such assertions and phrases of scripture will admit of a different rend'ring and interpretation, and that the reader will see these objections mention'd and consider'd in the body of this treatise: where it will appear, not only that the objection is invalid, but that truths of great importance in natural philosophy are really contain'd under these phrases, when regularly explain'd.

And why should any christian be tenacious of an opinion, that can reflect no honour upon his bible, but may be and has been improved to depreciate its value, and even to call in question its divinity?

But surely 'tis perfectly rational to believe, that the volume of God's word should give the truest account of his works: the arguments that may be brought for it are such as these:

I. To

1. To suppose the Divine Being to conform himself in his word to bare outward appearances, or to the false apprehensions of the vulgar, is such a supposition as we will not admit in any other case. The allusions and references of scripture to history or geography and the like, we maintain to be just and exactly true; and look upon ourselves as bound to believe and maintain the *history* as well as the *theology* of revelation; and why then should we not for the same reason account ourselves obliged to maintain that there is no mistake or misrepresentation in its descriptions of and references to natural things?

2. There are many philosophical passages, that cannot be regularly explain'd as conform'd to outward appearance, or the opinions of men. Witness the mosaic account of the creation and formation of all things. Can any one affirm that the first chapter of the bible is built upon a false hypothesis, or accommodated to vulgar apprehensions? And if it be not true either in appearance, or in reality, I see not how it can be true in any respect.

3. If God had thought fit to have made a revelation only of *divine* truths, then indeed we need not have expected any philosophy in his word. But as he has in innumerable places spoken either expressly or allusively of philosophical matters; we have surely

surely the highest reason to look for true philosophy in his word. Again,

4. There is a necessary connection between the knowledge of natural and spiritual things; since scripture constantly, or at least very frequently, refers our thoughts to natural ideas, in order to illustrate spiritual truths. And for this reason it appears to be of some considerable importance, that the natural ideas referred to, be strictly just and true, in order to be a proper foundation for a right conception and representation of divine matters. To conclude,

5. We must not suppose the word of God to speak false in any case whatsoever. Its history, its chronology and its philosophy, must be in fact as true as its theology. If we suppose any part of the divine word to be erroneous, this so far shakes the authority of all the rest. And as God knows all things perfectly, we must believe him the fittest to give us an account of his works as well as of his nature.

Let not any say, that philosophy is too abstruse and difficult a subject to be admitted into divine revelation; since there are many things of another nature, which are as perplexing and intricate as this, contain'd in it: and perhaps it will appear that a great part of the difficulty of this science does not so much arise from its nature, as from its being pursued to the neglect of those important discoveries which the divine word freely imparts to us.

C H A P. II.

*Concerning the effects and properties attributed
to the heav'ns.*

THE first chapter of the bible is really and designedly the most philosophical chapter of all: and in order to have a clear understanding of it, 'tis necessary to take in the whole substance of what revelation says concerning the subjects professedly treated of therein. I hope none that believe the bible to be the word of God, will venture to affirm that the mosaic account of the creation and formation of all things is false and imaginary. Neither can it be thought to be accommodated merely to vulgar apprehension; because nothing can be more foreign from our first apprehensions of things than the account given by Moses. For these and other reasons we cannot but conclude that it is a most regular, orderly and philosophical description of the formation of all things, whether we can understand every part of it clearly or no. But I hope we shall be able by degrees to receive an intelligible explanation of the most difficult parts of it, by comparing scripture with scripture, without having any recourse either to the antient heathens, or to the present systems of philosophy.

The first verse of the bible tells us, that *in the beginning God created the HEAV'NS SHaMaIM and the earth.* Our first enquiry then must be about the HEAV'NS, what is meant by them, what powers reside in them, and what properties belong to them?

The scripture uses two distinct words for them: the first is SHaMaIM, commonly render'd *heav'ns*: the other is SHa'HaKIM, commonly translated *the skies*. It will not be improper here to give some account of the etymology of these two words: not as if the evidence for any thing rested solely upon it, but only as it tends to illustrate or confirm what may afterwards be proved from other evidence.

SHaMaIM seems most naturally to be derived from SHUM, to *put* or *place*, and SHeMIM then must be the plural masculine of the participle active, and signify *the placers*: the same word signifies the *placers* or *putters* in Isa. v. 20. *wo unto THEM THAT PUT SHeMIM, darkness for light, &c.*

This name of the *heav'ns* is proper and significant; forasmuch as it will presently appear, that the *heav'ns* dispose and keep every thing in nature, in its proper place. SHa'HaKIM translated *skies*, seems to be the plural masculine of the participle active of SHa'HaK, which signifies to *strike against*, *to conflict*, or *to grind to powder*; and SHa'HaKIM may therefore be expounded
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the strugglers or *tethers in conflict*: and the word therefore is significant of the condition the heav'ns are in, as being in continual commotion and conflict; which will appear as we proceed.

Now let us learn from revelation what powers reside in the heav'ns, or what effects are ascribed to them. And truly, great things are said of the heav'ns, both by particular assertions and by general intimations. The heav'ns have an influence in producing the frost and congealing the ice, *Job xxxviii. 29. Out of whose womb came the ice and the boary frost of heav'n, who hath gender'd it?* The heav'ns likewise drop down and distil the dew, *Deut. xxxiii. 28. Rain and showers are represented as the effects of the heav'ns; for the SKIES SHa'HAKIM drop and distill the showers upon man abundantly, Job xxxvi. 28.* therefore they are call'd *the rain of heav'n*, *Deut. xi. 11.* But more expressly we read, *Deut. xxviii. 12. The Lord shall open to thee his good treasure THE HEAV'N to give the rain to thy land, &c.* 'Tis likewise clearly express'd, that the heav'ns were employ'd in the miraculous production of the manna, *Psal. lxxviii. 23, 24. He commanded THE SKIES SHa'HAKIM from above, and open'd the doors of heav'n, and rain'd down manna upon them to eat.*

Yea farther, the heav'ns are the instruments by which God blesses his people with
all

all plenty : as appears from *Malachi* iii. 10.
*I will open the windows of heav'n and empty
you out a blessing.*

We find a most beautiful gradation, expressing the natural order of causes and effects, when plenty of corn, wine and oil is given ; in *Hosea* ii, 21, 22. *I will bear the heav'ns and they shall bear the earth, and the earth shall bear the corn and the wine and the oil, and they shall bear Jezreel.* i. e. God would cause the heav'ns to fructify the earth, the fructified earth shall produce the corn and wine, and these shall supply the wants of Jezreel. So that this passage proves that the heav'ns cause the earth to produce the corn, wine and the like. This is farther confirm'd by what we read in *Deut.* xxxiii. 13, 14. *of the precious things of heav'n, brought forth by the sun, and thrust forth by the moon :* from whence (without any farther remark upon this passage at present) it seems evident, that the heav'ns are the cause of vegetation. And what is the nature of this influence, and the manner of this operation, we may learn from *Job* xiv. 9. where the growth of vegetables is ascribed to the *scent or steam* REH of water. The words run thus : *for there is hope of a tree if it be cut down, that it will sprout again, &c. for, thro' the SCENT of water it will bud and bring forth boughs as a plant.* Now the *scent or steam* of water is nothing else, but

the particles of water rais'd up and carried off by the light or spirit of the heav'ns.

Here, I conceive, is a fine discovery of the manner in which vegetative life is maintain'd, and if it be attended to by enquirers into nature, they will have a general clue by which to explain the whole of this subject.

There is no necessity to produce texts to prove that the heav'ns cause *thunder*, *lightning*, &c. I would therefore subjoin only one passage more; which if rightly render'd, proves that the heav'ns are the cause of the *cohesion* of matter. This is one thing, which our philosophers appear unable to give an intelligible account of. The question is, What is that power which causes two or more particles of matter to cleave or adhere to one another? Look then for an answer into Job xxxviii. 37, 38. The place is very much obscured by our translation. We read it thus. *Who can number the clouds in wisdom, or who can stay the bottles of heav'n, when the dust groweth into hardness, and the clods cleave fast together?* I would offer a different rend'ring, thus: *Who can number the SKIES or CONFLICTING ÆTHERS SHa'HaKIM in wisdom? And the FALLINGS NeBeLI of the heav'ns, who CAN MAKE TO LIE DOWN ISHCHIB? IN PRESSING BeTSeKeTH the dust INTO A CONCRETE LaMUTSAK AND SO CLODS or LUMPS UReGaBIM,*

URGaBIM ADHÈRE or CLEAVE TOGETHER *YeDuBaKU*. This translation doubtless will appear obscure to some, and imaginary to others; however, I think it may be justified; and if so, we cannot but make such remarks as these upon it. 1. That the adhesion of matter is here expressly mention'd and intended. 2. That the heav'ns or skies have an influence into it. 3. That the manner in which adhesion is perform'd is by compression, or by a pressing of the parts of matter together, for the dust is said to be compress'd into a concrete. 4. That parts of the heav'ns falling down upon the parts of matter compress them together; for 'tis supposed in the text, that fallings of the heav'ns compress the dust or grains into a concrete. But how this is perform'd, or in what manner the parts of the heav'ns fall down upon the grains, so as to concrete them, cannot be clearly made out at present, 'till we get farther into the subject; and then this text shall be resum'd. Only thus much we ought to believe from the expression; that there are such fallings of the æther towards bodies, as are sufficient to keep the parts of matter together by a strong compression.

The preceding extensive particulars concerning the powers and effects of the heav'ns, will be strongly confirm'd and greatly illustrated by the following general expressions.

When the Lord is said to *ride upon the heav'ns*, as in *Psal. lxviii. 4, 33.* Surely this intimates, that all the powers of nature are under the divine control, and that the heav'ns are his agents; when 'tis said, *that the God of Jacob rides upon the heav'ns for the help of his people, and in his excellency on the sky*, as in *Deut. xxxiii. 26.* We learn from hence, that God conducts all the operations of nature, or of the heav'ns for the good of his people, and makes use of them as his instruments, when he comes to their assistance. And to give us still a larger idea of the powers of the heav'ns, 'tis said *Psal. lxviii. 34. that God's strength is in the SKIES or CONFLICTNING AETHERS BaSHe'HaKIM.* Does not this passage intimate to us, that the skies are the instruments of the divine agency in nature? Surely something very great and noble must be meant by this expression.

And that the heav'ns have a governing influence over the earth, is clearly taught us in *Job xxxviii. 33. Knowest thou the ordinances of heav'n? Canst thou set the dominion thereof in the earth?* Yea there is a passage where the word *heav'ns* is used in such a strong and noble sense, that 'tis difficult to know whether it means the material heav'ns or God himself, *Daniel iv. 26. Till thou shalt have known that the heav'ns do rule.*

If by the *heav'ns* in this text we are to understand God himself, 'tis impossible for us

us to have a low opinion of the heav'ns themselves ; since God is compar'd to them, as he is the universal sovereign. But if the material heav'ns are intended, it follows, that the heav'ns have a very large dominion delegated to them by JEHOVAH himself. So that however this passage be interpreted, it enlarges our conceptions concerning the powers of the heav'ns in the operations of nature ; as well as of the power of God in the dispensations of providence. And now we begin to see in how noble a sense, *the heav'ns declare the glory of God, and the firmament shows his handy work,* Psal. xix. 1.

Let us then take along with us these sentiments which revelation gives us concerning the heav'ns, and we shall see an inexpressible beauty in those allusions or assertions, which we find in *Psal. ciii. 19. The Lord HATH MACHIN'D HeCHIN his throne in the heav'ns, and his kingdom ruleth over all.* And what follows in the succeeding verse, may perhaps be as elegantly applied to the material agency of the skies ; as to a spiritual agency, by the ministration of Angels. *Pf. ciii. 20, 21, 22. Bless the Lord ye HIS AGENTS MaLACHIV, that excel in strength, that do his commands, attending to the voice of his word : Bless the Lord all ye his hosts, ye ministers of his that do his pleasure : Bless the Lord all his works, in all places of his dominion.*

Should I suggest, that the heav'ns cause the revolution of the earth; because of what we read *Ps. xcvi. 11.* *Let the heav'ns rejoice or shine ISHMe'HU, and the earth shall be glad or revolve THaGeL;* It would probably be look'd upon as a forced interpretation; and therefore I shall not insist upon it as any part of the evidence. But if hereafter it should appear to be matter of fact, that the shining of the heav'ns is the cause of the revolution of the earth; then this interpretation may appear more regular and agreeable.

These are professedly very numerous, noble and extensive powers, which are here ascribed to the heav'ns. But let us not conceive, that this is the whole of the evidence, in favour of the agency of the heav'ns. For besides the strong and numerous passages already quoted, which only speak of the powers of the heav'ns in general; you will find several more assertions of the like nature, under the distinct constituent parts of the heav'ns, which are treated of in the next chapter: all which taken together, will doubtless justly warrant the following conclusion, namely: *that what we commonly call the powers of nature, do actually reside in the heav'ns or skies: and that the influence nature has in all material things, is no other than the operation or agency of the heav'ns.* Let the reader then carefully review these numerous and

and noble passages, and add to them what he finds of this nature in the following chapter, and he will be easily led into this opinion from scripture. And if this be a just inference, then 'tis plain, that revelation directs us where to turn our eyes and our thoughts, to find out a fair account for all those natural operations and effects, which our philosophers are at a loss clearly to explain.

'Tis true, that from the foregoing texts, we do not as yet see the manner of the operations of nature; but being thus far guided already in our enquiry, let us pursue revelation with some expectation, that it will unfold itself on this curious, delightful and important subject. If then we desire to know how these things are, or how 'tis possible for the heav'ns to produce the grand appearances of nature, we should regularly enquire in the next place, what *properties* are attributed to the heav'ns in scripture, and what is asserted concerning them.

The following particulars are extracted purely from the bible, which tend to give us some notion, what the heav'ns themselves are, and what properties belong to them; and thus revelation informs us, how they are qualified to perform the great things ascrib'd to them.

1. The matter or substance of which they are composed, was immediately created,

or brought into being by God himself. *For by the word of the LORD were the heav'ns made, and all their hosts by the spirit of his mouth,* Ps. xxxiii. 6. But as there is no occasion for much proof here, I shall therefore omit the various places to this purpose, and only make one remark upon the first verse of the bible, Gen. i. 1. *In the beginning God CREATED BaRA THE HEAV'NS ETH HaSHaMaIM, AND THE EARTH VeETH HaAReTS.* The original here is very emphatical, both as to the earth, and as to the heav'ns. I have before remark'd, that the original word for heav'ns signifies the placers; but this name was not given, until the matter of the heav'ns was form'd into an expansion, or firmament, as we are told Gen. i. 8. *And God called the firmament heav'n.* Therefore I apprehend the expression in verse 1st, is not: God created heaven, nor merely *the* heav'n, which would have been sufficiently denoted by the word HaSHaMaIM; but there is the particle ETH interposed: which particle seems to be peculiarly emphatical. In general it signifies *the very*: when applied to a person, it signifies, *himself*, when to a thing, *itself*; when to any thing consider'd as material, it signifies the *very substance, matter or essence* of the thing. So here. The first thing that God did was, to create the *very matter* of the heav'ns and of the earth. This matter of the heav'ns,

I would therefore call the celestial æther itself.

Allow me then the use of this phrase for clearness sake, in what I have farther to offer.

2. This celestial æther was *machin'd*, or form'd into a machine by the Creator; as appears from *Psalm viii. 3.* *When I view thy heav'ns, the work of thy fingers, the moon and the stars which THOU HAST MACHIN'D,* CONANTHAH. Again, *Prov. viii. 27.* *IN HIS MACHINING BaHaCHINO, the heav'ns I was there.* The Hebrew verb CHUN, from whence both the foregoing words are form'd, properly signifies, *to place and adapt things together in such a manner, as to become fit for operation:* which is the same as to *machine*: and 'tis very probable, that the *English* word *machine*, is derived from the Hebrew MaCHIN.

So that God, having created the matter or substance of the heav'ns, machin'd it in the next place, putting the several parts together in such a manner and order, as to rendet it fit to operate, when he should be pleased to set it in motion. These things being done, the heav'ns became a *machine*, a delegated agent, and then it is said, *God rested from it.* And this will appear to be the proper meaning of *Geh. ii. 1, 2, 3.* But I must take the liberty to give a literal translation of the third verse; where we read,

that

that God blessed the seventh day, and sanctified it, because in it he had rested from all his work, which he had created and made. The margin gives the literal rendering. He rested from all his work which he had created to make: i. e. he created and machin'd it into an instrument for operation, with this design, that it should act in such a manner as to carry on the operations of nature.

3. The heav'ns are exceedingly large and capacious; so vast as to be immeasurable, Jer. xxxi. 37. *If the heav'ns above can be measured, &c. then will I cast off all the seed of Israel.* The same thing is intimated to us by its height, Job xxii. 12. *Is not God in the height of heav'n?* xxxv. 5. *Look unto the heav'ns and behold THE SKIES, which are higher than thou.* Prov. xxv. 3. *The heav'n for height, and the earth for depth.* The meaning of which may be thus understood and explain'd. We that are upon earth, have sometimes one part of the heav'ns above us, and sometimes another part: but let our situation with respect to the heav'ns be what it will, yet always the height of the heav'n is far beyond our reach and view. Who then can describe or conceive, how extensive and capacious the heav'ns are?

4. The cælestial æther is exceedingly fine and pure, from all gross or defiling mixtures; which is strongly intimated to us when 'tis said,

said, Job xxv. 5. Yea, the stars, or rather THE FLUXES OF THE STARS, are not pure in God's sight: more generally, 'tis said Job xv. 15. Yea the heav'ns are not pure in his sight: and how strong to this purpose is Exod. xxiv. 10. As it were the very body of heav'n in his clearness: or, as it should be translated: as the very substance of the heav'ns FOR PURITY LeToHaR. And thus we see, that when the scriptures would give us the strongest idea of purity, they refer us to the heav'ns.

5. The heav'ns are exceedingly strong and firm. Thus we read, Prov. viii. 28. When he establish'd the clouds above: it should be render'd thus, WHEN HE MADE STRONG BeAMeTSO, THE SKIES SHa'HaKIM.

And to shew us that the heav'ns are inconceivably strong and powerful in their operations; 'tis said, Psal. cl. 1. Praise him in the firmament of his power. Once more see Job xxxvii. 18. Hast thou with him expanded the skies, which are strong as a molten looking glass. These descriptions, join'd with the foremention'd particular, teach us; that as the skies are sufficiently clear, fine and pure, to operate with freedom, so they are sufficiently powerful to perform the work assign'd them.

6. The cœlestial æther is in continual commotion and circulation. The word SHa'HaKIM, render'd skies, denotes, that 'tis in constant

constant commotion and conflict, the several parts striking against one another: for this, as has been observ'd, is the meaning of that word. And that it is in continual revolution, is intimated in *Psal. lxxvii. 18.* *The voice of thy thunder was in the heav'ns, in the margin'tis, in the wheel, in the original 'tis BaGaL GaL, in the circulation, or matter circulating.* But the constant revolution of the heav'ns is not only intimated, but explain'd, *Psal. xix. 5, 6.* *The sun or SOLAR LIGHT SHeMeSH, is as a bridegroom coming out of his chamber, and rejoices as a strong man to run a race; from the extremity of the heav'ns is its going out, and its revolution is to the extremity thereof, and nothing is hid from the beat thereof.* This passage is indeed generally understood of the apparent motion of the sun round the earth. But it will be made to appear hereafter, that the word SHeMeSH, intends not the body of the sun, but the light that flows from it: and therefore the text is to be explain'd in this manner: that the light of the sun flows out from the center to the circumference of the heav'ns, and returns to the center again. From hence it follows,

7. That the skies are in continual expansion. *Job xxxvii. 18. Hast thou with him EXPANDED THaRKIaNG the skies? Gen. i. 6, 7, 8. And God said let there be an EXPANSION RaKIaNG in the midst of the waters,*

ters, &c. This property of the heav'ns I do but just mention here; because the nature of an expansion must be consider'd hereafter in its proper place. But there is another property of the heav'ns arising from hence, which in my opinion crowns all the rest: and that is,

8. The skies *lean aside*, or incline more one way than another. There is a particular Hebrew word NaTaH, frequently made use of concerning the heav'ns; which is generally translated *to stretch out*. This act of stretching out the heav'ns is always ascribed to JEHOVAH, and is mention'd as a signal instance and demonstration of his wisdom and power. *Jer. x. 12.* *He stretch'd out the heav'ns by his discretion.* I should here produce and remark upon all the places where this act is mention'd; but that would be somewhat tedious. However, if any have a mind to look over the places for themselves, the following are all the passages I have seen or can recollect. *Job ix. 8.* *Ps. civ. 2.* *Isa. xl. 22.* *xlii. 5.* *xliv. 24.* *xlv. 12.* *li. 13.* *Jer. x. 12.* *Zeck. xii. 1.* Now every one knows, that the most proper and certain method to find out the real meaning of any word, is to consult the places where it is found; and having found out the general idea of it, to apply that idea to the subject treated of. And upon the most narrow search into lexicons, and passages quoted by them;

them, I find that this word signifies to lean aside, or incline more one way than another: in short it means *to bear, tend, incline, or stretch forth any way*, or in any particular direction.

'Tis evident then, if the heav'ns are made to incline more in one direction than another; they will cause any body placed in them to move or incline that way along with them. I wish I could here write in the plainest manner, that every one may understand. Tho' it be difficult, yet I would aim at it, being conscious that the idea is very clear in my own mind.

Observe then, that if the heav'ns, being in universal conflict, had equal motions every way, this would form an equilibrium, or equal ballance; so that no tendency any particular way would be produced by them; but if upon any occasions, or in any circumstances the æther presses more in one direction than in any other, the effect will be the moving of a body in it in that direction. Now then, JEHOVAH has by his infinite wisdom and power, so framed the heav'ns, that they always do incline more one way than another. For instance, the heav'ns have a prevailing pressure towards the body of the sun, from every part or quarter; so that there is a constant universal leaning towards the center of the system; and this produces the gravitation of heav'ly bodies towards

towards the sun. And this gravitation is so nicely adjusted, that it is just sufficient to keep the heav'ly bodies in their several circular orbits ; which would otherwise go forward in strait lines, and not in circles. There are several other cases wherein the heav'ns appear to press more one way than another, which is the proper cause of all that which the present philosophers call by the names of *gravitation* and *attraction*. The reasons which lead me to this interpretation are such as these.

1. Because the word NaTaH, primarily and properly has this signification of *inclining* or bearing in any particular direction. 'Twould be easy to produce a variety of passages in proof of this interpretation of the word. But there are two places which I cannot well omit ; where this root is applied to the heav'ns, and is by our translators justly render'd *God's bowing the heav'n*, Psal. xviii. 9. HE BOWED ALSO VaJeT, *the heav'ns and came down*. Again, *Psal. cxliv. 5. Bow HaT, thine heav'ns, O LOR D, and come down*. This phrase is certainly very grand and rhetorical : and appears extremely beautiful, if the *bowing* or *inclining* the heav'ns be the cause of the gravitation and descent of bodies to the earth : for then every one sees how exact the natural idea is, that is here used : and with what remarkable

2 *Philosophia Sacra: Or,*

propriety the *bowing* the heav'ns and *coming down* are connected together.

2. Because there is such a remarkable stress laid upon God's inclining the heav'ns: and whoever receives the true ideas of the nature and operations of the heav'ns, will find, that in this instance more especially, the wisdom and power of God appear: for 'tis by this means, all motion in nature is produced or continued in the most regular and effectual manner, and in the most exact and beautiful proportions.

3. Because it may be made to appear, that where there is such an universal expansion and conflict, there will be this inclination or tendency, which I have partly described.

4. Because this explication tallies with universal fact and experiment, and gives an intelligible account of gravitation and attraction. However, if any one can find out another interpretation that shall equally agree with the proper meaning of the word, and shall justify revelation in laying such a remarkable stress upon it, as it does; I am ready to yield. In the mean time let us now recollect together, what has been offer'd, into one view.

If the cœlestial æther is form'd into a machine vast and large, if it be inconceivably fine and pure, inexpressibly powerful and strong; if it be in continual commotion and

expansion, and has a perpetual power of gravitation ; what property is now wanting to render it a fit agent, capable to perform all the operations of nature ? and to produce all the sorts of *attraction, gravitation, cohesion* and the like, which appear in the course of nature.

But how it has these properties, and produces these effects, we must learn from the account revelation gives us of the constituent parts of the heav'ns and firmament : which shall be consider'd in the next chapter.

C H A P. III.

Of the constituent parts of the heav'ns.

HAVING seen what are the chief powers and properties of the heav'ns according to scripture, we should be desirous to learn, in the next place, what we are to understand by the *heav'ns themselves*, wherein they consist, and of what they are composed ; otherwise 'tis impossible for us to conceive why they have those powers and properties ascribed to them. And we shall find, that revelation amply indulges us in this enquiry : for it informs us, that the chief contents of the heav'ns or skies, are

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these. 1. The *darkness*. 2. The *spirit*. 3. The *light*. 4. The *luminaries and their fluxes*. 5. The *fire*. 6. The *density*. I need not in this place bring particular proofs, that each of these parts belong to the heav'ns, for that will appear as the passages of scripture are produced under each head. Neither need I here give the reason why I place them in this order, because that likewise will be giv'n under the particulars. And,

1. I begin with the *darkness*, because Moses does: for he no sooner had said that God created the heav'ns and earth, and that the earth was without form and void; but he adds, that *darkness was upon the face of the deep*. What is here meant by *the deep*, shall be consider'd when we come to speak of the earth.

The *hebrew* word 'HoSHeC, seems to take its name from the verb 'HaSHaC, which signifies to *binder, stop, prevent, or forbid*; for we shall presently see that darkness is nothing else, but the ætherial matter in a state of inactivity, stagnation or stoppage; prevented of that regular and swift motion, whereby light is produc'd. 'Tis not, as our philosophers conceive, the bare absence of light, but 'tis real and proper matter, as much as light or spirit; for we read, *Exod. x. 21. of darkness in Ægypt. which may be felt*: which certainly intimates, that the æther was then in such an extraordinary state of stagna-

stagnation and inactivity, as to become an object of the sense of feeling ; it was really palpable. Farther 'tis said to be created. *Isa. xlvi. 7. I form light and create DARKNESS.* From which passage, join'd with the consideration of *Moses's* mentioning darkness in the first place, we may probably conclude, that the heav'ns were created in a state of stagnation or darkness, and were afterwards form'd into the condition of light. And let it farther be remark'd, that if we acknowledge light to be properly *matter*, we are compelled from scripture to believe that darkness is matter likewise ; unless we suppose an annihilation : for we read *Isa. v. 30. the light is darken'd in the heav'ns thereof.*

I would likewise observe, that in the sentence immediately preceding in this very verse last quoted, we read, *behold darkness and sorrow* : but the word [*and*] is put in by our translators, and it should be read, *behold darkness COMPREST TSaR.* 'Tis acknowledged indeed, that this whole passage is allusive ; but if the allusion be just, we may from hence learn, that light by being restrain'd or stop'd becomes darkness : and likewise that darkness, which in itself consists of loose atoms in stagnation, may be, and sometimes is comprest into grains. And that light is turn'd into darkness by stagnation or stoppage, is farther confirm'd by

what we find Eccl. xii. 2. *While the light or the sun or the moon or the stars BE NOT DARKEN'D, LoA THe'HeSHaC, or restrain'd, or stop'd in its enlightening motion.* And now we may guess, what Moses means when he says Gen. i. 4. that *God divided the light from the darkness; or rather as 'tis in the original; he divided BETWEEN BIN the light, AND BETWEEN UBIN the darkness;* which expression seems to imply more than a bare division; and leads us to conceive of a mutual exchange; light being converted into darkness, and darkness into light, by taking away from the one, and giving to the other mutually; this I conceive was done, by giving the earth its diurnal motion round its own axis. Read that passage, Gen. i. 4. 5. with attention. *God divided between the light and between the darkness. And God call'd the light day, and the darkness he call'd night.* Every one knows that without the rotation of the earth round its own axis, the light is not *day*, nor the darkness *night*. Therefore the diurnal motion began at this time: and we know that by means of this daily motion, the airs that were in a state of darkness all the night, are enlighten'd in the morning, and the airs that were enlighten'd all the day long, grow darker and darker in the evening: so that by the constant motion of the earth, the darkness is turn'd into light at the morning edge of the earth,

earth, and the light turn'd into darkness at the evening edge. All this is confirm'd and illustrated by the exact description we have of the regular returns of morning and evening, in *Amos v. 8.* *He turneth the shadow of death into morning, and maketh the day dark with night.* Upon the whole then, we here learn that *darkness* is the fine æther in a state of stagnation or stoppage.

2. We next regularly proceed to consider *the spirit RUA'H.* This word is used for the spirit of *God*, for the spirit of a *man*, and for the spirit of a *beast* too, *Eccl. iii. 19, 21.* But we have the word under consideration, only where it intends the *spirit of the heav'ns*. The reason why I take notice of the spirit in the second place, is because I conceive *Moses* does. For after he had said that darkness was upon the faces of the deep, he immediately subjoins, that the *spirit of God mov'd upon the faces of the waters.* If indeed these words refer us to the divine spirit, they do not belong to our present subject. But is there not some reason to apprehend that the *material spirit* is here meant? especially when we remember that motion is ascribed to it. The spirit of *God moved, or was a mover,* *McRa'He-PHeTH.* The root of this word is to be found but in two other places in all the bible. *Jer. xxiii. 9. all my bones SHAKE,* *Ra'HePHU.* *Deut. xxxii. 11. as an eagle*

FLUTTERETH YeRa'HePH, over her young. As therefore this root signifies a tremulous motion in other places, such as shaking or fluttering, it ought to be so expounded in *Genesij*: and then it must intend a tremulous motion of the spirit upon the faces of the waters. What these waters were must be consider'd, when we come to speak of the earth. Further observe, that *Moses* is here professedly giving us an account of the regular steps that were taken in the first formation of all things; and accordingly mentions first the darkness, then the spirit, then the light, next the expansion, and last of all the lumenaries; all in the most exact order: so that it seems most regular to understand this of the spirit of the heav'ns. Neither does this supposition contradict, but rather confirm the notion of the divine spirit's agency in creation; since the material spirit is that, by which the divine spirit is typed forth to us: and its being called in this place the SPIRIT OF GOD RUa'H ELoHIM; is not a sufficient objection against its being understood of a material agent: since the phrase SPIRIT OF THE LORD, RUa'H YeHoVaH, is to be explain'd in this sense, *Isa. xl. 7.* Where it is said that the spirit of the Lord bloweth upon the grass of the field.

We need not be at any loss to know what is meant by the RUa'H or spirit in a natural sense, as it is the very word that
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is commonly used for the *air*, or for the *wind*, which is nothing else but the air in a sensible and palpable motion. From whence we must certainly gather, that the spirit does not consist of such fine particles as the light; for air is sometimes so gross that it may be felt, but pure light cannot: light can pass thro' glass, &c. freely; but air cannot. Let us now see what the scripture says of and ascribes to this *material spirit*. It has some agency in forming and dissolving the ice, *Ps. cxlvii. 17, 18.* It likewise operates in the production of the *fætus* in the womb, *Eccl. xi. 5.* *Thou knowest not the way of the spirit, as the bones grow in the womb of her that is with child.* It is farther intimated, that this spirit has an universal influence in continuing the succession of all the animal and vegetable creation. *Ps. civ. 30. Thou sendest forth THY SPIRIT, they are created, and thou renewest the face of the earth.*

The extent of its influence in nature, together with the absolute dominion of God over it in all its operations, are both taught us by the two following expressions, *Prov. xxx. 4. He gathereth THE SPIRIT in his fists, and Psal. 18. 10. He rode upon a cherub and did fly, yea he did fly upon the wings of THE SPIRIT.* What is intended by God's making a weight for the spirit, as 'tis said, *Job xxviii. 25.* I know not, unless it means that he proportions it with regard to its

quantity, as it is said in the next words he does by the water: for the whole verse runs thus: *he maketh the weight FOR THE SPIRIT LaRUa'H, and WEIGHETH, or SETS IN ORDER THiCeN, the waters in a measure.* We have some account likewise of its effects in or upon the heav'ns themselves. *Job xxxvii. 21. And now they see not the PURE LIGHT AOR BaHIR, that is IN THE SKIES, BaSHe'HaKIM, but the spirit PASSES AWAY NGaBeRaH, and cleanseth them.* The natural meaning of which text, I take to be this: That unless the spirit passes away we cannot see the pure light of the skies; but by its passing away, the skies are cleansed: plainly denoting that the *spirit* is the grosser parts of the heav'ns, and the *light* is the finer and purer part.

There is one more place concerning the spirit which deserves special consideration, *Eccl. i. 5, 6.* which I apprehend shews us the agency of the spirit and light, in producing the regular alternate returns of morning and evening; of summer and winter; but as that place speaks more of the solar light than of the spirit, I must therefore defer the explication of it for the present; and go on.

3. To what *Moses* mentions in the next place, namely, *the light*. For having spoken of the darkness and spirit, he adds, *Gen. i. 3. And God said, let there be light and there was*

was light. As for what Moses says concerning the dividing between light and darkness, and God's calling the light day, and the darkness night, these things have been explain'd under the word *darkness*. There are several places that speak of the light, as that which renders objects visible; but I shall pass over these, because there is no necessity to enlarge upon or prove, what every one knows and acknowledges. But let us not imagine, that this is the whole use of it in nature: for we have already learn'd, that it is the finest part of the heav'ns, from *Job xxxvii. 21.* We are told likewise, that it scatters the east wind upon the earth, *Job xxxviii. 24.* It being therefore the purest part of the heav'ns, we are to conceive it to be the same with the pure æther mention'd *Job xxxvii. 11, 12.* The place needs a fresh translation thus. *Also THE PURITY, or pure æther BeRI, wearieth the DENSITY NGaB, it scatters the cloud of his light, and it is turn'd about by his commandments, that they may do whatever he commands them upon the faces of the world TOWARDS THE EARTH AReTSaH.* That is, the clear pure light disperses the denser airs, and thereby performs the will of God. We shall have occasion to consider this place afresh, when we come to speak of the *density*. All that need be remark'd at present is, that the light, being the finer part of the æther, unfolds or disperses,

disperses, or tears to pieces, the grosser parts of the heav'n. The consideration of the luminaries and their fluxes, will give us some farther instruction into the nature and operation of light ; but I must not here omit to observe, that the LIGHT AOR, is said to be upon THE WINGS CaNPHOTH, of the earth, *Job xxxvii. 3.* and therefore has some agency in producing its rotation.

We should now, according to *Moses*, proceed to the *expansion*, which is produced by the mutual acting of the light and spirit on each other : but as that belongs rather to the agency than to the parts of the heav'ns, let us pass it by for the present, and go on to consider.

4. The *luminaries* and their *fluxes*. Understand by the *luminaries*, the *bodies* of the sun, moon, and stars; and by their *fluxes*, the flow of light that comes from each of them to us. As the misinterpreting of the words used in scripture upon this subject, has occasion'd the chief perplexity and confusion that now attends the philosophy of scripture, 'tis therefore peculiarly necessary, that a fair and clear interpretation be giv'n.

The case is this : 'tis evident that scripture (at least according to the present translation) asserts, that the sun rises and sets ; speaks of the stars as in motion ; and of the earth, as if it stood still. From hence principally, it has been concluded by philoso-

phers, that revelation was not intended to speak properly upon natural subjects; but that it accommodates itself to outward appearance, and to the apprehension of the vulgar; yea and many common christians to this day firmly believe that the earth really stands still, and that the sun moves all round the earth once a day: neither can they be easily persuaded out of this opinion, because they look upon themselves bound to believe what scripture asserts. But I hope we shall easily remove these obstructions, and answer these difficulties, by a fair and close review of what revelation affirms upon this subject. As for the earth's standing still or moving, that must be consider'd when we come to speak of the *earth*. At present, we must only attend to the meaning of scripture, when it mentions the sun, moon and stars.

Moses in Gen. i. 14—18. speaks of two luminaries MeAROTH, or instruments for light, which were ordain'd to rule over the day and night, and to divide between the light and darkness, &c. But 'tis very necessary, that we should distinguish between *luminaries* and *lights*, as the scripture actually does: see Ps. lxxiv. 16. *thou hast MACHIN'd HaCINOtha, THE LUMINARY MAOR, and the sun SHaMeSH.* If the conjunction [and] be copulative in this place; then 'tis plain, the luminary and the SHaMeSH,

MeSH, are distinct. Observe here, as we pass on, that MAOR signifies a luminary or instrument of light, and AOR intends *light*.

Now the sun, moon and stars are called, not luminaries, but *lights*, AORIM. *Ps.* cxxxvi. 6, 7, 8. This distinction is confirm'd *Ezek.* xxxii. 8. *All THE LUMINARIES MAORI, OF LIGHT AOR, in the heav'n I will make black over thee*: as that place is actually render'd in the margin. As therefore revelation thus distinguishes, 'tis very improper for us to confound these two things together. But this is far from being the whole evidence for this distinction. Let us see what words in scripture intend the luminaries themselves; and what words are used for the fluxes of the light from them. This ought to be fairly review'd, because every one knows, that tho' the bodies of the sun, moon and stars, take up but a small part of the heav'ns, yet the fluxes of light from them reach even to the earth, yea, and diffuse themselves throughout all nature.

Now, whoever reads his bible in the original with any care and attention, will presently see, that our translation has given us the same *English* word *sun*, for three distinct words in the *Hebrew*, SHeMeSH, 'HaMaH and 'HeReS. Our translation has likewise given us the same word *moon*, for two different original words YaRa'H and LiBNaH. And 'tis this has occasion'd all the confusion

sion to the *english* reader. But yet these things ought to be distinguish'd; for there is no reason to imagine, that revelation should give us two or three distinct words for the same precise idea. This subject I conceive may be clear'd up to full satisfaction. For sacred scripture always couples SHe-MeSH and YaRa'H together, which two words are translated *sun* and *moon*: after the same manner it couples 'HaMaH and LiB-NaH together; which are likewise render'd *sun* and *moon*. Let us then in the first place see what is intended by the SHeMeSH and YaRa'H, the first of these pairs.

The SHeMeSH is frequently said in our translation to rise and set. As in *Gen.* xxxii. 21. *Numb.* xxi. 11. *Deut.* xxiii. 11. *Josb.* i. 4, 15. xiii. 5. *Jud.* ix. 33. xix. 14. xx. 43. *2 Sam.* xxiii. 4. *Ps.* l. 1. civ. 19, 22. cxiii. 3. *Jer.* xv. 9. In all these places, and perhaps in several more, the *Hebrew* scriptures constantly express the sun's *rising* by the verb ZaRa'H, and its *setting* by the verb BOA.

Now here it is necessary to be remark'd, that the word ZaRa'H, does not properly signify to *ascend*, but to *spring out*. Neither does the word BOA signify to *descend*, but to *go in* or *go off*. 'Tis evident then, that tho' the body of the sun does not rise or set, yet the light of the sun does actually *spring out*, in the morning; and *go off*, in the evening. For when and where it is

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morning with any people, there and then the solar-light springs out to them: and where and when it is evening with any people, there and then the solar-light goes in or goes off, as to them. Upon this interpretation of these scripture phrases, 'tis evident that revelation speaks with the utmost propriety, and expresses philosophical truth.

But should any still question whether SHeMeSH intends the *light* of the sun; and insist that it does or may signify *the body* of the sun, I would turn him to a few philosophical passages. But I must first a little enlarge upon my meaning. What I aim at is this, that the word SHeMeSH intends the light that flows from the sun, YaRa'H means the light that is reflected from the moon; and that COCaBIM, the word usually render'd *stars*, signifies the fluxes of light from the stars: and not by any means the bodies of the sun, moon, or stars. And therefore I shall call the first the *solar-light*, the second the *lunar-light*, and the third the *stellar-light*. Now follows the proof.

1. The SHeMeSH, YaRa'H and COCaBIM, are said to be *portion'd out*, or *imparted unto all people under the whole heav'n*, Deut. iv. 19. Which expression is not properly true of the bodies of the sun, moon and stars; but is strictly true of the fluxes of light from them.

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2. The SHeMeSH and YaRa'H, are said to stand still in a miraculous way at *Joshua's* command, *Josb.* x. 12, 13. The place now quoted, has been constantly brought as an objection against the scripture's allowing the motion of the earth, and is insisted on as a proof, that the scriptures assert the motion of the sun round the earth. But I conceive that the chief of this mistake arises from quoting the place imperfectly. 'Tis usually said thus. Does not *Joshua* say, *sun stand thou still*; and the next words are generally drop'd or forgotten: whereas it runs thus. *Sun stand thou still in GIBEON, and thou moon in the valley of AJALON.* Now I ask, Was the body of the sun in *Gibeon*, or the body of the moon in the valley of *Ajalon*? Surely no: but the light proceeding from the sun, and the light reflected from the moon were both there. *Joshua* therefore plainly means not the *bodies*, but the *lights* of the sun and moon here. And the nature of the miracle was this. The lights of sun and moon, which according to the natural course of things, should have pass'd on, were made to remain for a time in the same situation in *Gibeon* and *Ajalon*. And this was brought to pass by a miraculous power, without making any alteration in the bodies either of the sun, moon, or earth. Many reasons may be offer'd to prove that this was the true nature of the miracle;

miracle; but let this one suffice; that if either the earth or sun were suddenly stop'd, an universal confusion must have follow'd of course; and so there must have been 10,000 miracles in one to have prevented that consequence; and surely there is no occasion to suppose that. So then, altho' this place does not ascertain which moves, the body of the sun or ball of the earth; yet it proves that the words SHeMeSH and YaRa'H mean the *light* of the sun and moon. Again,

3. The SHeMeSH is said to be *hot* or heated at noon, see *1 Sam.* xi. 9. *to morrow by that time the sun be hot*, and *Neb.* vii. 3. *Until the sun be hot*: in these places a common reader must see, that the word *sun* cannot intend the sun's body; but only the rays of light from the sun, as they strike upon the earth, and are heated by friction, or striking one against the other. Again,

4. The heat, the sun and the moon are said to smite us. Thus, *the sun smote upon the head of Jonah*: and 'tis promised, *Ps.* cxxi. 6. *The sun shall not smite thee by day, nor the moon by night*: so again, *Isa.* xlix. 10. *Neither shall the heat nor sun smite them*. 'Tis easy to see that the expressions in such places, are very improperly applied to the bodies of the sun or moon; but may be understood with the utmost propriety of the rays and fluxes of light from them.

I might here produce all the places, which are very numerous, where these three words render'd sun, moon and stars, *must* or *may* be interpreted the *light*, not the *bodies* of them. Let me set a few of them before you, and for brevity's sake, I will translate the places according to this method of interpretation, on purpose that the reader may see how properly the places are thus render'd, Judges v. 20. *The fluxes of the stars*, not the bodies, *in their courses fought against Sisera*, Jud. v. 31. *As the going forth of the solar-light in its strength.* Neh. iv. 21. *From the rising of the morning until the fluxes of the stars came out.* Job xxv. 5. *The lunar light does not fix a tabernacle; and the fluxes of the stars are not pure in his sight.* Psal. civ. 19. *He made the lunar-light for seasons; the solar-light knows its going in.* Ps. cxxxvi. 7, 8, 9. *To him that made great LIGHTS AORIM,* (not luminaries) *the solar-light to rule the day, and the lunar and stellar light to rule the night.* Eccl. xi. 7. *Truly the light is sweet, and it is a pleasant thing for the eyes to behold or look at,* (not the solar body, the view of which is very offensive to the eyes, but) *the solar light.* Observe here the word *light* is a general term, including all or any of the sorts of light; while the SHeMeSH, YaRaH and COCaBIM signify the light as coming from the sun, moon and stars, respectively. Carry

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therefore this distinction into the next quotation, Eccl. xii. 2. *While the solar-light, or the light, or the lunar, or stellar light, be not darken'd or stop'd; so as to be turn'd into darkness.* Isa. xiii. 10. *The stellar fluxes of the heav'ns and their constellations, shall not irradiate their light, the solar-light shall be darken'd or stop'd in its going out, and the lunar light shall not make its light to shine out.* Isa. lx. 19, 20. *The solar-light shall be no more thy light by day, neither for splendor shall the lunar-light enlighten thee; thy solar-light shall no more go in, neither shall thy lunar-light gather in itself.* Jer. xxxi. 35. *The LORD giveth the solar-light, for a light by day; and the ordinances of the lunar and stellar light for a light by night.* Ezek. xxxiii. 7. *I will cover the heav'ns, and make the stellar fluxes thereof dark, I will cover the solar-light with a cloud, and the lunar-light shall not irradiate its light.* Joel ii. 10. *The solar and lunar-light shall be dark, and the stellar fluxes shall gather in, or withdraw their splendor.* Joel ii. 31. *The solar-light shall be turn'd into darkness, and the lunar-light into blood.* But I am weary of transcribing. And in reality I know of no places where these three words under consideration *must* not, or *may* not be thus render'd and interpreted. Let not any imagine, that the above-mention'd passages were pick'd and chosen to the neglect of others, on purpose to make this scheme

scheme appear the more probable; for I can assure him, that they were noted down (as I passed on in collecting philosophical texts) as places which at first view appear'd the most likely to overturn the scheme; but upon a more thorough search they all fell in with it, confirm'd it, and illustrated it. The conclusion then is this: that if these words *must* necessarily be thus understood in some places; and *may* in all; 'tis but just, reasonable and proper, that they should in all places be understood in this sense.

But I have likewise another reason, for setting these several places before you, namely, that you may be led to take notice, that sometimes the sun is said to be darken'd, or turn'd into darkness, and the moon to withdraw or gather in itself, and the like: from whence it must be inferred, that the words under consideration, cannot signify the bodies of the sun, moon, or stars: nor merely the light from them; consider'd only in such a state as to render objects visible: But the words intend the fluxes of light themselves; or the fine æthereal matter that irradiates from the sun or moon, or stars; whether this æthereal matter be in such a motion as to convey light to our eyes or no. Thus, for instance, the solar-light exists and operates in a dark dungeon, nay throughout the whole ball of the earth; altho' it be there

darken'd or prevented of that free motion; whereby it makes objects visible.

Give me leave then to draw the coclusion intended; and for the future I must take and explain these words in the foregoing sense. Let us next see what properties and effects are in scripture ascribed to the solar, lunar, and stellar light.

1. 'Tis evident then, that the springing forth of the solar light causes the morning; its going off causes the evening; its being stop'd or prevented of its free motion by the body of the earth causes *night*; and its shining with freedom causes *day*.

2. The solar light acts in a mechanical way, and is part of the great machine of nature. *Ps. lxxiv. 16. Thou hast MACHIN'D HaCINOTha, the luminary and the solar-light.* The same is said concerning the lunar and stellar lights. *Ps. viii. 3. When I view thy heav'ns the work of thy fingers, the lunar and stellar light which thou HAST MACHIN'D CONaNTHaH.* So again, *Ps. lxxxix. 36, 37. His throne shall endure as the solar light before me, it shall be MACHIN'D YICON, as the lunar light, a faithful witness IN THE CONFLICTING ÆTHER BaSHa'HaK.*

3. The solar-light is in continual motion to and from the body of the sun, as appears from *Ps. xix. 5, 6.* which place has been constantly, thro' mistake, understood of the

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apparent motion of the body of the sun round the earth. But since the word SHe-MeSH, does not mean the body of the sun, as has been proved, therefore the place must have a different translation and interpretation, after this manner, *the solar light is as a bridegroom coming out of his chamber*, or closet, namely, from the solar fire, the center of the system, *and it rejoiceth as a mighty one to run a race*: FROM THE EXTREMITY MiKeTSeH of the heav'ns, (which must be the center as just now intimated) is its going out MOTSAO, AND ITS REVOLUTION THeKUPaTHO, TO THE EXTREMITY OF THEM, KeTSoTHaM; *and nothing is hid from the beat thereof*, i. e. From the extremity of the heav'ns it goes out, and to the extremity it returns. No words can express more exactly the motion of the solar light in its going out from the center to the circumference of the heav'ns, and its return to the center again.

4. The solar light, along with the spirit, which continually attends it, is the cause of the alternate regular returns of morning and evening, of summer and winter. The passage which expresses this, is what was but just mention'd when we were treating of the spirit, and was referred hither for an exact translation and regular explication. 'Tis in Eccles. i. 5, 6. *The sun also riseth, and the sun goeth down, and hasteth to the place whence*

be arose, &c. It needs a fresh literal translation. Give me liberty then to render this remarkable passage exactly literal, and then to give a little illustration of it. It runs word for word thus.

And the SOLAR LIGHT SHeMeSH SPRINGS OUT ZaRa'H, and THE SOLAR LIGHT SHe-MeSH GOES IN BA; AND TO ITS PLACE VeEL MeKOMO, DRAWS IN SPIRIT SHO-APH, AS IT SPRINGS FORTH ZOReH, THITHER SHaM. IT GOES HOLeC, toward the south, and turns about unto the north, IT WHIRLS ABOUT CONTINUALLY SOBeB, SoBeb: THE SPIRIT GOES HOLeC Ha-RUa'H, AND UPON ITS CIRCUITS VeNGaL SeBIBoTHIV THE SPIRIT RETURNS SHaB HaRUa'H. Let the reader review a little this translation, and endeavour to realize it to his mind, and he will soon see that from hence it appears, 'tis not the *wind*, but the *solar light* that is said to go north-ward and southward: and therefore 'tis plain, that here is intended something concerning winter and summer, as well as day and night. So then this place takes notice that the solar light springs out in the morning, and goes in, in the evening; that it goes south-ward to form the winter, and north-ward to form the summer. And 'tis here asserted, that the spirit continually attends and pursues it in all its motions and circulations: for we are told, *that the solar light draws in spirit*

as it springs out. And that the spirit goes and returns along with the light in all its circulations round the earth. Thus much, I think, is directly asserted in this quotation. Now then, as the whole of this motion is ascribed to the light and spirit, and not at all to the earth; we have therefore reason to think, that the spirit and light are the agents, and the earth only the patient: and if so, then the motion of the earth round its own axis, and round the sun, and its inclining northward and southward at different times, are all produced by the mutual action of the solar light, and the spirit. And tho' this conclusion may not be readily admitted, as properly derived from the text; yet there will be sufficient reason to think, that *Solomon* had this in his eye, if it should appear, from the nature of scripture philosophy, that the spirit's pursuing the solar-light, is really the cause or maintainer of these motions.

5. Both the solar and lunar light are said to have an influence into the production of vegetables. *Deut. xxxiii. 14.* *For the precious fruits brought forth by the sun, or SOLAR LIGHT, and for the precious things thrust forth by the moon or LUNAR LIGHT.* The operation of the light whether solar or lunar upon the earth, to cause the growth of plants and the like, seems to be directly intended here; and 'tis a very curious subject to look into; but this must be left to philosophical

enquirers; 'tis sufficient for scripture to assign the cause, and to give us a general account of the manner of its operation.

Thus much revelation gives us concerning the operations and effects of light in general, and of the solar, lunar and stellar light in particular. But some may be ready to say, if these three words which are the most frequently used in scripture, do not mean the bodies of the sun, moon or stars; has it then given us no account of the heav'ly bodies themselves, and used no words for them? I answer, it has. 'Tis true, the scripture speaks but little of them; as we have not an immediate concern with them.

It has been observ'd, that SHeMeSH and YaRa'H are coupled together in scripture, and signify the solar and lunar light: now we are to remark, that the two other words which are render'd sun and moon, are pair'd after the same manner: namely, 'HaMaH and LiBNaH. Now I say that these two pairs are kept so distinct from one another, that whenever our *english* translation mentions sun and moon together, it is in the *Hebrew* always SHeMeSH and YaRa'H, or else 'HaMaH and LiBNaH; neither is this distinction ever invaded; for SHeMeSH is never coupled with LiBNaH, nor 'HaMaH with YaRa'H. But tho' the *Hebrew* scriptures preserve this distinction so carefully, yet our translation has made no difference;

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but has render'd both the former and the latter of these two couples by *sun and moon* equally.. Now then, having prov'd that the former pair means the *light* of the sun and moon, let us see what the latter intends. And 'tis worth while to observe as we pass on, that tho' the SHeMeSH is said to spring out and go in; this is never said concerning the 'HaMaH.

We are in some measure directed to the true explication of this last pair, by the etymology of the two words, now under consideration, for 'HaMaH is undoubtedly derived from 'HaMaM, which signifies *to be, or to make hot*: and LiBNaH is as evidently derived from LaBaN *white*. According to this derivation of the words which our lexicons direct us to, the 'HaMaH should intend the *extreme heat*, that is at the body of the sun: and LiBNaH should mean *the white of the moon*. The places in which either 'HaMaH or LiBNaH are found, as respecting the sun and moon, are these which follow, which I would give you translated according to the above derivation and interpretation. *Cant. vi. 10. Who is this that looks forth as morning, fair as the WHITE OF THE MOON, clear as THE HEAT OR FLAME of the sun. Isa. xxx. 26. Moreover the light of the WHITE OF THE MOON shall be as the light of the FLAME OF THE SUN, and the light of the FLAME OF THE SUN shall be*

be seven-fold. Isa. xxiv. 23. The white of the MOON shall be confounded, and THE FLAME OF THE SUN ashamed. These are all the places, I think, where 'HaMaH and LiBNaH are coupled together. And there is but one more passage I can find where 'HaMaH is translated the sun. Job xxx. 28. *I went in black without the sun* BeLoA 'HaMaH, i. e. WITHOUT THE FLAME or HEAT OF THE SUN.

There is another word in the Hebrew 'He-ReS translated *sun*, which seems to mean the solar body or fire itself. For 'tis used in Deut. xxviii. 27. for a *burning ulcer*. And there are but three places where 'tis found and translated *sun*. Judges viii. 13. *And Gideon return'd from battle before the sun was up*. If this rend'ring were just, it would indeed suppose the solar body to arise and move round the earth: but the original is this, MiLMaNGaLaH He'HeReS, which literally render'd is, *the sun being above, or in the meridian*: so that I should apprehend that the phrase signifies the *noon*, when the solar body is to us in the meridian, or its utmost height. Judges xiv. 18. *On the seventh day before the sun went down*; this likewise I conceive is improperly translated; the original is BeTeReM YaBoA Ha'HaRSaH; which word for word is thus; *before it went in or off towards the solar body*. The expression being *towards the sun*, plainly intimates,

mates, that the motion is not in the solar body, but in something else. Once more see *Job xi. 7. He speaks to THE SOLAR FIRE La'HeReS, and IT SPRINGS NOT OUT LoA YiZRa'H, and seals ABOVE THE FLUXES OF THE STARS BeNGaD COCaBIM.* This place has been generally thought to intend something miraculous; but there being no such miracle recorded as God's commanding the sun not to rise, and sealing up the stars, inclines me to think, that it means something in the ordinary course of nature, which is very wonderful; and so the meaning may be this, That God keeps the solar fire from springing out, and seals up the stars, or makes them to be fix'd in the heav'ns. The word *stars* here as in other places, does not intend the *bodies* of the stars, but their *fluxes*; and his making the stars themselves to be fix'd, is expressed by his sealing *above* them; or setting a seal at the head of these fluxes.

This brings me to another enquiry, which may be reasonably made. If the word CO-CaBIM signifies *the fluxes of the stars*; does scripture then say nothing of the stars themselves? I answer yes; in the place just quoted, as already explain'd, and in *Job xxii. 12. Behold the HEAD RoASH of the stars, how high they are!* For if the word COCa-BIM means the fluxes of light from the stars, then the *head* of these fluxes most properly denotes the *stars* themselves.

Let

Let me conclude this long account concerning the luminaries and their fluxes ; by repeating in brief what scripture means by the several words here used.

MeOROTH signifies the *luminaries*, AORIM *lights*, SHeMeSH *the solar-light*, YaRa'H *the lunar light*, COCaBIM *the fluxes of the stars* : 'HaMaH *the solar beat or flame*, which is extremely clear at the surface of the sun's body. 'HeReS *the solar fire*. LiBNaH *the white of the moon*. RoASH COCaBIM *the head of the stellar fluxes, or the stars themselves*.

One more remark is proper to be made, for the sake of the *english* reader. That wherever he sees the words *sun, moon, or stars*, in his bible, they always mean the *lights* and not the *bodies* of the sun, moon or stars, excepting in those comparatively few passages, which are quoted under these last paragraphs, where I treat of the *luminaries themselves*. There is indeed one place where is mention'd *the east-gate*, in the margin *the sun-gate*, Jer. xix. 2. where the original is SHaNGaR Ha'HaRSITH.

5. The fifth constituent part of the heav'n's is the *fire*, which *Moses* makes no express mention of ; for what reason he omits it, I know not, unless it be supposed that he includes it under the word *expansion* or *firmament*. And indeed there need not much be said upon it here : since the properties
and

and effects of it are well known by general experience; and scripture expressions exactly suit thereunto. We know, and scripture declares it to be *burning, flaming, devouring, dissolving, melting*, and the like. But there is a place which speaks expressly of the power of the fire upon the heav'ns themselves.
2 Pet. iii. 12. The heav'ns being on fire shall be dissolved, and the elements shall melt with fervent heat. Now if we consider the properties and powers of fire, the effects it produces upon the heav'ns and the earth; we shall see sufficient reason to conclude, that it is in itself no other than that vehement friction of the several parts of the æther, which dissolves and melts the grosser parts of the heav'ns, and makes them become fine; that friction which tears the masses or denser parts to pieces, and dissolves them into loose atoms.

6. The sixth and last constituent part of the heav'ns is the *density*, the original word is NGaB. The root signifies to be dense or gross, in opposition to being rare or fine. It is applied therefore in scripture to any parts or places of the heav'ns, which are so gross as to obstruct the passage of light. 'Tis therefore sometimes to be understood of the clouds, as in *2 Sam. xxiii. 4. A morning without DENSITIES NGaBOTH.* *Job xxvi. 8. He bindeth up the waters in HIS DENSITIES BeNGaBaIV, and the cloud is not rent under them.* *Ps. cxlvii. 8. He covers the heav'ns*

WITH

WITH DENSITIES BeNGaBIM, he prepareth rain for the earth. Eccl. xi. 3. If THE DENSITIES HaNGaBIM, be full of rain, they empty themselves upon the earth. Psal. civ. 3. He maketh DENSITIES NGaBIM, his chariot, and walks upon the wings of the spirit, or wind. But let us not imagine that the clouds are the only densities that are in the heav'ns : for there are several texts that seem to carry our thoughts much higher and farther than the clouds ; even to the very extremity of the whole system of nature. There are densities above the clouds, yea above the stars themselves. See Job xxii. 12, 13, 14. *Is not God in the height of heav'n, and behold the head of the stars how high they are?* Which words plainly speak of the very verge of nature : ver. 13. *And thou sayest how doth God know? Can he judge thro' the THICK DARKNESS, OR GRAINS NGaRa-PHeL,* and what this thick darkness is, we are inform'd in the next words, v. 14. DENSITIES NGaBIM are a covering to him that he seeth not, and he walks upon THE CIRCUMFERENCE 'HUG of the heav'ns. See again, Isa. xiv. 13, 14. *For thou hast said in thine heart, I will ascend into heav'n, I will exalt my throne above the stars of God; I will ascend above the heights of the DENSITY NGaB;* I will be like to the most high. The dense gross airs that are at the extremities of the heav'ns, are emphatically called the DENSITY,

SITY, as in Job xx. 6. *Tho' his excellency mount up to the heav'ns, and his head touch THE DENSITY NGaB.* Let us now see what idea the scripture gives of it, and how it is acted upon.

This density then is said to be continually unfolded or dissipated, Job xxxvi. 29. *Can any understand the DISSIPATINGS OR UNFOLDINGS MiPHReSHI of the DENSITY NGaB, or the tumultuations of his tabernacle?* To the same purpose is Job xxxvii. 16. *Dost thou know THE ROLLINGS MiPHLeSHI of THE DENSITY NGaB, the wond'rous works of him which is perfect in knowledge.* If you would know how the density is thus dissipated, and made continually to unfold itself, you have an account of it, Job xxxvii. 11, 12. *THE PURE ÆTHER BaRI WEARIETH, or breaks in pieces YaTRia'H THE DENSITY NGaB, and so it scatters the cloud of his light.* The meaning of which is plainly this; that the finer or purer æther of the heav'ns is continually acting against, wearying of and breaking to pieces this density, at the extremity of the system, and so unfolds it. This thickness of airs is beautifully term'd *the cloud of God's light*, because 'tis that out of which the finer æther is extracted, and into which it returns.

Now consider the nature of this density: how the heav'ns are grosser and grosser, the farther from the sun at the center, and the nearer

nearer to the circumference; till perhaps at the utmost extremity, they are condensed into an immoveable solid. How these grosser airs are, by the motion of the solar-light made to revolve towards the center, and *so are turn'd about in circulations to perform the will of God upon the earth*, as 'tis express'd Job xxxvii. 12. this is surely a very beautiful speculation; and perhaps by this description, some other phrases of scripture may be well explain'd.

Is it not by the unfoldings and revolutions of the density, that *God brings forth the spirit out of its treasures?* Psal. cxxxv. 7. Jer. x. 13. li. 16. Is it not because the heav'ns are surrounded with this density, that God says *Isai. l. 3. I clothe the heav'ns with blackness, and make sackcloth their covering?*

And lastly, as we now know that the strongest friction and greatest commotion of the heav'ns is at the center, and this commotion gradually decreases till it quite ceases towards the circumference, is it any way irrational to conceive, that it is in this manner, and in this sense, that God is said *to make peace in his high places?* Job xxv. 2.

Thus we have, as it were, the whole of what scripture declares, concerning the constituent parts of the heav'ns. And if we briefly recollect, what has been discover'd from revelation concerning them; we shall find reason to conceive, that all these constituent

tuent parts (the bodies of the sun, moon and stars excepted) are in reality no other than the different states or conditions into which the æthereal fluid does or may occasionally pass. For the *darkness* is the fine atoms of the heav'n in a state of stagnation or inactivity, as at first created; or else the light prevented or stop'd in its enlightning motion. The *spirit* is the grosser parts of the heav'ns or masses compress'd together; while the *light* is the atoms, or finest part of heav'n in swift motion; which is sometimes so quick and free as to render objects visible. The light of the heav'ns is to be consider'd as distinguish'd into the *solar*, *lunar* and *stellar* lights, and these several lights being constantly attended with the spirit operate throughout nature: the *fire* is the *friction* of the parts of heav'n against one another, which melts or dissolves the heav'ns into the finest and purest æther. This friction is greatest at the center; and it gradually decreases towards the circumference; where the heav'ns are very much condens'd, and this is call'd the *density*. All these parts of the heav'ns being in constant commotion, conflict, and revolution; give us the clearest and strongest idea we can have of the heav'ns themselves as they now subsist: and now we begin to have some clear notions, how it comes to pass, that the heav'ns have all those properties and powers, and produce all the effects

ascribed to them. But I have almost anticipated what belongs to the next chapter: namely, to describe the operation of the æther upon itself.

C H A P. IV.

Concerning the manner in which nature operates.

IF we ask a philosopher of the present age, how it is that nature acts; he tells us, that 'tis by what he calls a *vis inertiae*, and by *attraction*: and then he proceeds to inform us, that there are several sorts of attraction: namely, that of *gravitation*, *cobhesion*, *magnetism* and *electricity*. He observes likewise some appearances of a *repulsion* in nature. From whence some have infer'd, that the cause of all the operations of nature is the *vis inertiae* join'd with attraction and repulsion. Great pains have been taken to investigate these principles, and as much to explain and apply them: and truly their application of them to nature is very entertaining, and for the most part mathematically exact: yea and the several properties of matter and laws of motion which arise from these principles, may be look'd on

on as in fact a true account of the laws, rules and proportions, according to which nature acts. But every one of these principles need explication ; and here the philosopher himself appears to be at a loss. What I have just said is understood by the learned ; but there is reason to fear it will be unintelligible to a common reader, and 'twould take me up more words to bring these principles down level to the capacities of mankind in general, than can at present be used. These things shall therefore be past over, and we will proceed to the scripture account of the manner in which nature operates.

This I find to be *mechanical*. Most persons know what a *machine* is ; and every one will observe, that in a machine the several parts or the several wheels touch one another ; and so act only by contact. Now I say then, that 'tis in this manner nature acts, according to scripture. One that has carefully perused the foregoing collection of texts, will observe that scripture frequently uses the word *machine* ; the original root is CHUN ; from whence probably the English word *machine* is derived. And this Hebrew root properly signifies *to put or adapt the parts of things together in such a manner as to render them fit for use or operation*. If then nature acts in this way, it must act by contact. And shall I venture to say that 'tis impossible for us to conceive how one

part of matter can act upon another part without touching it. Is not matter in itself *quite dead?* Take into consideration any atom or mass of matter, and conceive, if you can, how 'tis possible for this atom or mass to move itself, and if itself be moved, how it is possible for that to move another atom or mass without touching it. Again, if a particle of matter be at rest, conceive, if you can, how 'tis possible for that particle of itself to produce motion in any other particle even when in contact, much less if there be any space between them. Again, let a piece of matter have a motion given to it, and conceive if you can, how 'tis possible for that piece of matter of itself to be continued in motion any longer than while the force that gave it the motion, or some other force continues to act upon it. May we not venture to pronounce all this really impossible in the very nature of things: upon this bare consideration, that matter itself is *dead:* and if it has any *life* in it, surely that life cannot be material, or be an essential property of matter. But not to proceed any farther in this way of reasoning: let it be observ'd, that if nature acts mechanically, it must be by contact, *i. e.* by one part, piece or atom of matter touching the next to it. Now then, as there is certainly an impression that reaches throughout nature (for instance, the sun has an influence, or ope-

operation even to us) I say, from hence it follows, that nature must be so full of matter as to be in contact throughout. If then we take the scripture account, we shall not be at a loss to know what nature is filled with, since we are inform'd of the density at the extremity, of the solar fire in the center, and of fire, light, spirit, darkness, &c. existing and operating throughout all nature.

More particularly, scripture assures us, that nature acts by *expansion* and *compression*. These two necessarily involve each other, for there cannot be *compression* without *expansion*, nor *expansion* without *compression*; as will be evident when we consider the nature of both.

The Hebrew word used for the *expansion*, translated the *firmament*, is RaKIA NG. The root RaKaNG, signifies to *expand* or *spread out*. The regular account Moses gives us of it is this: He had mention'd the *spirit*, which is the grosser part, and the *light* which is the finest part of the heav'ns: these two light and spirit, are supposed to be in a continual conflict, struggle and commotion, and by this means an *expansion* is produced; which I would thus explain. There is what our philosophers call the *elasticity of the air*, which may in some measure illustrate this subject. For it is known, that air expands itself whenever the pressure

of the surrounding air is taken off. What is here known and seen concerning the air, is equally applicable to the light: for as the air is expanded by the rushing in of the light, so the light is expanded by the rushing in of the air. Or thus: whenever any place happens to be occupied more than common by the finer matter, there the spirit rushes in, *if it can*, and expands the light, and wherever any space is occupied by a more than ordinary quantity of the grosser matter, there the light rushes in, *if it can*, and expands the spirit. I put in these words, *if it can*, because in some cases *it cannot*: Now, I say, when it can, it does rush in to restore an equal balance; where it cannot there it presses, continually attempting to restore the balance. Moses declares several things concerning the operation of the expansion upon the earth; which must be referr'd to that subject. But at present we must take notice, that this expansive force is that by which nature operates; and 'tis exceedingly strong: so strong as to give us the most lively idea of the divine workmanship, *Psal. xix. 1. For the firmament or expansion shows his handy work:* yea so strong, as to be denominated the power of God, or at least an eminent display of it. *Ps. cl. 1. Praise him in the firmament, his power.* And from this expansion seeths to arise all the strength of the skies. *Job xxxvli. 18. Hast thou*

*thou with him expanded the skies, which are
strong as a molten looking glass.*

Since the operations of nature are thus declar'd to be mechanical and expansive; and since we are inform'd of the nature, parts, powers and effects of the heav'ns, we are necessarily led to the following conclusions; which will, I hope, make the whole scheme of reveal'd philosophy appear plain and easy.

i. God created a vast number of particles called *the matter of the heav'ns*. Each of them were inconceivably small, and perfectly solid : so small and solid as to be entirely indivisible by any created power. Such particles as these we usually call *atoms*. Every one of these atoms were in themselves dead and motionless ; had in themselves no attractive, repulsive, or elastic powers : or in other words, had no power to move themselves, no power to produce motion in other bodies ; had no power to stop motion or rebound it ; nor to continue it when imprest : but were of themselves mere unactive matter. Each of these atoms must be supposed to have a determinate shape and size, and were capable of being moved. And by the way, this is all that revelation seems to take for granted ; namely, that matter is in itself *absolutely dead and unactive*, having no properties, but what necessarily arise from its very nature and existence : every thing else that regards the mutual operation of matter

upon itself is expressed and explain'd to us. Whether all the atoms of the heav'ns were of the same bulk and figure, is perhaps impossible for us to know. In these atoms likewise consist the first principles of all natural causes : since no one of them is capable to be in two places at one instant, nor any two of them capable of being in the same place at the same instant.

2. These atoms were placed by one another in contact, in a very large sphere, confin'd at the extremities, and not permitted by the Creator to exceed those limits. This is necessary to be supposed, otherwise there could be no proper mechanism. But tho' all these particles touched one another, in order to be capable of impressing one another if moved ; yet the contact was not so compleat as to prevent a possibility of motion : perhaps the contact was such as is in a cask full of marbles, or of any fluid ; where the particles are so close to another, that none of them can be moved, without moving in some proportion all the rest.

3. These atoms had no power to cleave to one another, or to press upon each other, while void of motion ; but lay by one another without the least mutual impression. The atoms in this state of stagnation seem to be no other than the primitive *darkness* mention'd Gen. i. 2.

4. These

4. These atoms were all in the next place put into commotion by the divine immediate power: some moving one way some another; so as to make an universal conflict or struggle, continually rubbing against, striking upon, or sliding by one another. The atoms in this commotion is, I conceive, what is intended by the SHa'HaKIM the SKIES, or æthers in conflict. This universal commotion, must of necessity cause an universal stress and compression upon every atom in proportion to the violence of the motion impressed.

5. This universal compression would of course make some of these atoms cleave to one another and form masses, some larger and some smaller: while others would remain in single atoms, and in swift motion. These *masses* thus produced, are the *spirit* or *air*; and these *atoms* in this motion are the *light*,

6. In this compleat commotion, some of those that were comprest into masses are by friction or rubbing, melted or dissolved again into atoms; and some of these that were thus reduced into atoms, are again comprest into masses. Now the friction or rubbing that reduces, dissolves or melts the masses into atoms, is the *fire*, as is intimated, 2 Pet. iii. 12. *The heav'ns being on fire shall be dissolved, and the elements shall MELT with fervent heat.*

7. If

7. If in any places in this commotion there should be a collection of single atoms, these would make the least resistance, being, as is evident, in a state of the most perfect fluidity. On the contrary, if in any places there be a collection of the grosser masses, these would make a greater resistance, because less fluid. And therefore,

8. Wherever there should be a more than common proportion of single atoms, there the surrounding grosser masses would be pressing in upon them to expand them: and on the contrary, wherever there should be a more than ordinary proportion of the grosser masses, there the surrounding finer atoms would press in to expand them. This must necessarily be the consequence where there is a constant pressure, commotion and conflict: for upon this account all nature tends to an equilibrium or equal balance. Here you have then a strictly proper idea of the nature and cause of expansion and compression.

One more remark will be sufficient to set the whole in a fair light.

9. If in any places there be a stronger motion, and greater friction than in other places; there would, of course, be a greater proportion of single atoms: and so on the contrary, the less friction the more masses; because it is the nature of friction or fire to reduce the masses into atoms.

Let

Let us now bring all these thoughts together, and apply them to what is fact, as to the heav'ns in the present system.

There is doubtless the strongest friction at the center by reason of the solar fire. It follows then, that there is the greatest number of single atoms at the center: and the size or number of the *masses* increase in some proportion to the distance from the center. So that the heav'ns are finest towards the center, and grossest towards the circumference: at the center they are finest of all; at the circumference they are grossest of all. This grossness at the extremity is called the *density*; where perhaps at the utmost bounds of nature, the heav'ns are congealed into an immoveable solid.

Further, if there be the greatest collection of atoms or light at the center, then there will be the greatest pressure of the masses or spirit towards it, and the strongest flow of atoms or light from it. And if the greatest friction or fire be at the center, that friction will dissolve the masses which flow in, into single atoms.

Thus a constant revolution will be produced. For the continual influx of masses, and efflux of atoms will maintain the central friction: the constant friction will maintain the proportion of atoms there: and the minuteness of the particles at the center, will maintain the constant flowing in of the spirit,

spirit, and flowing out of the light. If any should here query, whether the central fire can be maintain'd without fuel, since no fire that we know of can: let it be remark'd, that what we call fuel is in itself no part of the fire, or of the light that flows from it: for the atoms of other matter cannot be converted into light: but the case is this. The friction tears the fuel to pieces, and the fuel itself either flies away in smoke or steam; or else subsides in ashes or cinders. So that the fuel is nothing else but the medium or instrument in which and by which the fire acts. Now then, either the fire at the sun is maintain'd purely by the influx and efflux, because it is properly central; or else there is such an instrument prepar'd for it to act in, as can abide the action of the fire, without being reduced to ashes, or flying off in steam.

This is the glorious machine which God himself has created and form'd: and when he had done this, he rested from all his work. But lest any should imagine the Deity is excluded, by making all nature to be mechanical: I would here in one view set before you what the great author of nature did at first, and is now continually doing.

1. He at first created the matter of the ~~beav'ns~~ as well as of the earth.

2. He gave to matter its existence and mechanical powers: by forming every atom

of

of a proper shape and size, and making it perfectly solid and indivisible by any created power.

3. He sets every atom of matter in its proper place, to operate or be operated upon.

4. He puts the whole machine into motion; or set every part of it a going.

And tho', having done these things, he rested from the work of creating and forming; yet this machine is not so independent upon its former, as a clock is upon a clock-maker; who can go and leave it and 'twill work of itself: far from it, for

1. God upholds the whole in existence continually.

2. He maintains its mechanical powers.

3. He keeps it all together in a machine.

4. He can and does interpose, to disturb the natural order of things, or to accelerate or retard the motions at his sovereign pleasure. From all which it follows,

5. That the honour and glory of every effect produced by this machine, and the expansive powers with which 'tis invested, ought to be ascrib'd to God immediately: because the machine acts purely in a mechanical way; the whole and every part of it being entirely without sensation, will, thought, design, or knowledge: and God alone foresaw, design'd and contriv'd every particular before-

before-hand; and fitted, and upholds, and governs the machine on purpose to fulfil all his will.

Thus you have before you a general view of the system of nature, derived entirely from Revelation. If you have a desire to understand it clearly, think it over, realize it to your mind, and it will gradually become familiar to you. Look over the evidence and see whether it be not sufficiently strong and clear. Is not this undoubtedly the philosophy of scripture; does not every passage coincide with, confirm and clear up the beautiful scheme? If any should say; all this is only a preconceive'd scheme, and then the scripture was distorted to give a sanction to it: The only answer I shall give is this. Let the reader remember, that I myself was educated upon other principles, and let him conceive the pains taken by me in the search, as represented in the first chapter, and he will, I hope, decline such a suggestion. If it should again be intimated, that 'tis usual when any scheme is aim'd at, to produce those places alone, that make for it; let him again remember, that the *whole* bible was read, and here are the chief of the places of scripture set before his eyes. Neither is there one passage knowingly or designedly omitted. And in a word, upon the most diligent search; I am quite unconscious, that there is any one portion of scripture, that

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so much as seemingly contradicts it, if the original be consulted.

Should it be farther said; that it does not appear this system can account for and explain the phænomena of nature. What will the philosopher say, if upon these principles every one of his allow'd laws of motion and properties of matter, can be clearly and mechanically explain'd by these scriptural *data*: when he himself knows that he cannot do it? That they can be thus explain'd, I shall endeavour to make out in the next chapter.

C H A P. V.

Of the manner in which the heav'ns operate upon all other matter.

THE present philosophers have, with indefatigable industry, applied themselves to the study of nature; and that not without success. For they have actually investigated the general laws of motion and properties of matter, as they appear in the operations of nature. They have seen, that nature operates according to the most simple and beautiful laws, and with more than mathematical exactness. They have likewise applied the principles of the mathematics to these

these general laws, in such a manner, as to be very entertaining and instructing. For these things they are deservedly esteem'd: and perhaps this is the farthest, that mere reason and experiments could lead them, with any degree of certainty.

But surely it must be allow'd, that there is a great difference between investigating the *laws* according to which nature acts, and assigning the *true cause* of these operations. This seems to be reserv'd for revelation; because no philosophers, as I know of, could ever ascertain what are the agents by which nature acts, or how these agents perform their work: at least they have never agreed upon this subject.

Now then, let me address myself to apply the principles of revelation to the investigated laws of nature. The reader will excuse me from proceeding any farther than this. Because a large treatise would be necessary to explain all the appearances of things upon these principles; and there are doubtless, many things that will be difficult after all; for there must be mysteries in philosophy as well as in divinity.

The general laws investigated by philosophers are exceedingly extensive in their application; as those that are acquainted with them very well know. And surely the philosopher must be very desirous to have such things as these clearly accounted for;

for; neither need he entertain an objection against what is here offer'd to his view; since this account will not render his mathematical principles useless; but leave him in full possession of these entertaining studies, and give him room to introduce them into philosophy, in order to describe, compute, and demonstrate the exact and beautiful proportions, according to which nature operates.

The use of philosophic terms cannot be avoided here: and altho' the common reader may be perplex'd by them; yet perhaps by the hints suggested, he may be able with attention to understand the meaning of them.

1. *The vis inertiae.* 2. *The attraction of cohesion.* 3. *Elasticity.* 4. *The attraction of gravity.* 5. *The attraction of magnetism.* 6. *The attraction of electricity.* The philosopher who understands these terms, knows the vast extent of their application: I shall freely leave the application of them by mathematical principles to him, as I heartily approve of, and admire the ingenuity and exactness of his calculations: and shall content myself with what I proposed.

1. The *vis inertiae* of matter includes in it two things: 1. The resistance that bodies make to any force imprest, and 2. The continuance of the motion of a body, when 'tis once giv'n to it.

As to the first of these: it is known and allow'd, that all bodies in nature have a power of resistance in proportion to the quantity of matter in them, or at least nearly in that proportion. The present philosophers account for this appearance after the following manner. They say resistance is a property inherent in matter, necessarily arising from its nature. They conceive that, because matter is dead, or (as they term it) *inert*, therefore it must have an inclination to continue at rest when it is at rest, and an inclination to continue in motion when put in motion; and that therefore it must resist every impression made upon it, that would put it out of that state of motion or rest in which it is. But may we not with equal justice reason in this manner? That because matter is in itself absolutely dead, therefore it has no power at all, either to produce, continue, or resist motion: for all which necessarily arises from the notion of matter, as to this subject, is, that two atoms of it cannot exist in the same place at the same instant. But I see not how it can of itself either produce motion or resist it. How can one piece or atom of matter give any resistance on any side, unless there be something behind to prevent its giving way? And further, is it not fact, that every body has a greater power of resistance in the fluid of *quicksilver* than of water,

water, in water than in air, in the air of the atmosphere, than in the *pure æther* of the heav'ns ? I ask then, whether we may not rationally conclude from this experiment, that the power of resistance which appears to be in bodies, arises from nothing else but the nature, the grossness, or fineness of the fluid in which they subsist. And now 'tis easy to make it appear, how all bodies in nature come to have a power of resistance. Let the reader then recollect, that all nature is (according to the scripture system of philosophy) filled with the matter of the heav'ns in its several conditions of darkness, light and spirit: and that the whole is surrounded with the density at the extremity. Now then, as all bodies exist in this æthereal fluid, 'tis evident they cannot be moved without meeting with some resistance; for in such a confin'd sphere of matter, no part can move without striking against and moving away another part. And since it appears, that matter has not in itself a power of resistance, from hence it follows, that the whole resistance bodies in motion meet with, arises from the confinement at the extremity, and from the ease or difficulty with which the particles of any fluid can move by one another, or can pass thro' the pores of the moving body. Further, as all bodies are porous, and as the cœlestial æther is so fine,

as to insinuate itself into and pass thro' the pores of every body; it therefore can and does produce a power of resistance upon the inward as well as outward parts of a body: for every single particle of matter, which the æthereal fluid touches, must receive a power of resistance by that touch, as really as if that particle was by itself in the open expanse.

The other thing included in the *vis inertiae*, is the continuance of motion when it is once given. It is indeed confessed, that all bodies in general, which we are acquainted with, do continue in motion, when they are once put into motion, in the same direction, and with nearly the same velocity as at first imprest, unless some other cause stops it or turns it aside. The present philosophers account for this appearance from the very nature of matter; by supposing, that since matter is dead or *inert*, therefore it must have an inclination to continue in motion, when once put in motion, as well as to continue at rest, when it is at rest. But surely this is ascribing too much to dead unactive matter. How is it possible to conceive, that a body should continue moving any longer, than while 'tis driven forward by an impulse behind? But now let the reader realize to his mind the nature of that expansive fluid in which all bodies subsist, and he will easily see how the continuance of

of motion is effected. For the moment any motion is given to a body in the expanse, the finest parts of the æthereal fluid, which either pass thro' the moving body, or are near to it, will rush in *first*, to take up the space behind, which the body leaves: the reason why the finest parts must rush in *first of all* is, because they move with the greatest ease and freedom: by this means then, 'tis evident, that the ballance of the æther is in that place destroy'd: and it is in the nature of the expansion to attempt to restore that ballance. The expansion then in this case causes the coarser air to rush in upon the finer; and so it pursues the moving body, and perpetuates the motion. Thus all the while the motion lasts, the finer æther is rushing in behind the moving body, and the coarser æther is continually rushing in upon that, and so a real impulse behind is produced and continued. And remember that all this is as true concerning every particle of a moving body, as concerning the whole body in motion. And observe here, that the more violent the first motion is, the more the equilibrium or ballance is in this manner destroyed: and so the coarser air acts with the greater force. As long then, as there is any prevailing impulse behind, there must be a motion: and this thought will easily account for the equability, acceleration, and retardation of motion. For if

this prevailing impulse continues equal and unalter'd, the body impelled by it will move with an equable, uniform motion. But if the prevalency of the impelling force decreases, the motion of the body will be retarded, and if it increases, the motion will be accelerated. I proceed now to the second principle.

2. *The attraction of cohesion.* By this term philosophers mean, that power, which causes two or more particles of matter to adhere or cleave together. 'Tis evident, there is such a power in nature, because many millions of atoms are made to adhere in one solid; and in various instances this adhesion may be destroy'd; for the parts of matter that cleave together may be separated. The question then is, what can be the cause of this cohesion? Philosophers ascribe it to an attractive power in matter, and therefore call it the *attraction of cohesion*. But surely 'tis evident from what has been said concerning dead inactive matter, that it cannot have in itself any attractive power. The philosophers in this instance have not only ascribed too much to matter; but have, in my opinion, forgotten or contradicted the scripture account of cohesion. What account the scripture gives of it shall be mention'd presently. Only I must first remind the reader of the nature of an expansion. If then there be, as revelation teaches, a

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constant and uniuersal conflict in the cœlestial æther; it follows from hence, that every body put into it must of course hinder or obstruct the free motions of the æther in some degree; and the body itself is press'd upon or struck against on every side by it. Now then let us, for illustration, suppose two small bodies to be placed near to one another in this expanse: it is very clear, that the free motions of the æther will be most of all stop'd in the space between these two bodies, and the æther cannot strike so strongly against these two bodies on their two sides which are nearest each other, as elsewhere: the consequence then is, that the pressure of the æther is so far taken off in the space between, while it remains all around: so then, the free motions of the æther around will push these two bodies together with all the force, with which the pressure of the æther around, exceeds the pressure of the æther between the two bodies. And if these two bodies be supposed to be without pores, they will then be driv'n together with all the force of the firmament. This accounts for the cohesion of the small and perfectly solid parts of matter together.

As for the cohesion of larger masses, which are very porous: 'tis easy to conceive; that the pores of these bodies are so form'd, as to be capable of admitting only the finer parts

of the expanse, while the grosser are excluded: and in this case, 'tis evident from the nature of expansion, that the coarser æther will continually attempt to rush in where the finer æther is admitted; but because it cannot gain admittance, it therefore falls upon, lies down upon, and presses upon the parts without, and so compresses them together. I say then, that this is exactly the scripture account of cohesion. And here I must, according to promise, resume the consideration of Job xxxviii. 37, 38. I shall only repeat the literal translation already giv'n, referring back to page 18th. *Wbo can number the conflicting æthers in wisdom, and who can cause the fallings of the heav'ns to lie down, in pressing the dust into a concrete; and so clods adbere.* Compare this text diligently with the account just now giv'n of the cause of cohesion; and you will plainly see how these two mutually confirm and explain each other. So then it is evident from the text, that the cause of adhesion is not in the matter that adheres, but in the surrounding cœlestial æther: and that it is not perform'd by attraction, but by pressure: for the æther does, in this case, actually fall down upon, lie down upon, and press upon the parts that cohere; and so causes the cohesion.

It might not be improper to observe here, that there are different sorts and degrees of

cohesion, which may all be easily explain'd upon the foregoing scripture principles: for instance, some bodies adhere with greater firmness than others: the reason is, because the pores of some bodies are so small or so form'd, as to admit only the very *finest parts* of the æther; and then the parts of those bodies are separated with the greatest difficulty: while the pores of other bodies are so form'd, as to admit parts of the æther which are more gross; tho' not *so* gross as the surrounding æther, and then their parts may be separated with less difficulty.

Again, we find the same bodies sometimes soft, and sometimes hard; sometimes fluid, and at other times solid: this is often occasion'd by the different conditions the æther within and about these bodies appears to be in, at different times. For instance; when the æther is in its usual state, it compresses metals into a firm solid; but when the æther is put into a finer condition, by strong friction or *fire*; then a great part of the compression is destroy'd, and the metal becomes fluid.

If there be any necessity to confirm this account of the cause of cohesion; I may refer to an experiment of two finely polished planes, which being put together, will adhere with considerable firmness, because hereby the grosser air is excluded, and only the finer æther admitted.

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3. As for *elasticity*, 'tis no other than a consequence of cohesion: 'tis that property of some bodies, such as *ivory*, *steel springs*, &c. whereby they have a power to return to their former figure, when bent, or press'd. The same power that makes bodies cohere, will press the parts of matter together again, when by any accident, they are partly driv'n asunder: I mean if the parts are not so far separated as to destroy the cohesion. For if any parts of matter are driven so far asunder as to admit the coarser surrounding fluid of the heav'ns, the adhesion is destroy'd, and the parts are said to be broken asunder. But if they are, by any force, separated from one another, but a very small distance, not sufficient to admit the coarser air; then the expansive power of the heav'ns will compress them together again, when that force which separated them ceases to act.

By the way, this thought fairly accounts for the difference between what is called the attraction of cohesion, and what is called the attraction of *gravity*; since cohesion does not admit the coarser fluid; while *gravity* evidently does. To which we now proceed.

4. *Gravity* is the inclination of earthly bodies towards the earth, and of the large heav'ly bodies towards the sun. Nay, this principle of gravitation is universal; and very beau-

beautiful and regular. This has been generally ascribed to *attraction* by philosophers; but how there comes to be this universal attraction, they are not able to explain; only they can and do in a very beautiful manner, give us the proportions of it, and compute those proportions mathematically. The cause of this universal gravitation, I have supposed, is intimated to us by the heav'ns being said to *incline or lean aside*: but I now come to explain the cause expressly. The gravitation or inclination of the earth, and of the planets towards the sun is thus plainly accounted for. Be pleased to recollect, that according to the scripture system; there is a continual flowing of the *light* or atoms from the sun, and of the *spirit* or masses to it; and that the heav'ns are finest at the center, and grossest at the circumference; and that they are finer, the nearer to the sun, and grosser the farther off from it in a very regular proportion: the necessary consequence of this is, that all the planets must gravitate or incline towards the sun; because there is a prevailing pressure towards the center.

Besides this, 'tis known that the moon and all earthly bodies gravitate towards the earth; and that the satellites of *Jupiter*, and the moons of *Saturn*, gravitate towards the bodies of those planets respectively: which is thus produced by the heav'ns. The æthe-

real fluid, as has been prov'd, is a mixture of light and spirit in continual commotion and struggle; so that some of the particles of the heav'ns in each part of space are moving one way, and some another in all directions; so that these opposite motions resist and ballance each other mutually: if therefore these motions are in any measure stop'd in one direction, there will follow a pressure and inclination of the fluid in the contrary. Now then, any solid body placed in these conflicting æthers, does actually stop some of the motions of the æther more than others; for it obstructs most of the motions that would otherwise have passed from the body outward all around it, and therefore the æther must have a prevailing pressure towards the body inward. This observation will hold equally true of the earth and moon, and of all the planets both primary and secondary; and ought therefore to be applied unto them. You will find a fuller illustration of this in the Appendix. Thus then, there is a leaning in the heav'ns towards the sun at the center, and towards every large body in them.

Yea, and upon a due consideration it will appear, that this leaning or inclining of the heav'ns more one way than another, must be less and less the farther off from the center, or from any large body; and that the force decreases generally, as the squares of

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the distances increase, according to the true language of our mathematical philosophers.

5. As for magnetism, I may well be excused from attempting to assign the cause of the attraction of the loadstone ; and indeed this subject deserves a treatise of itself. I would only give the general hint. Observe therefore ; that as so much of the pressure of the air is taken off one way, by so large a body as the earth ; 'tis impossible any bodies on earth should produce any other gravitation towards themselves ; unless they take off the pressure more than the earth itself does. But we have reason to think, that the loadstone is so framed as actually to prevent the free motion of the æther more than even the earth itself does, only with this difference, that the earth prevents the passage of the æther *every way* ; but the loadstone does it only *one way*, namely, towards the north and south poles of it, and therefore it causes a tendency in the steel, (which is a body similar to itself) towards it. This power of the loadstone may be strengthen'd or weaken'd, destroy'd or restor'd, as we learn by experiment ; which I think may be illustrated, by the same bodies being at different times pellucid and opaque, i. e. being at one time capable to admit the light freely thro' it, and at another time stopping it.

One thing more I have mention'd to be accounted for, from the principles of sacred philosophy, and that is,

6. *Electricity.* But this is introduced rather as a proof of the whole scheme, than as an appearance to be accounted for by it. Our philosophers seem to be full of confusion and admiration, when they make these experiments. But nothing is more easy to be conceiv'd of upon the principles of revelation. Let a few hints be sufficient; tho' the subject deserves a large treatise. In the operations of the electric machine, we have a small specimen of the grand system of nature. The globe by turning swiftly round, and rubbing against a hand or piece of leather, and the like, imitates the friction of the sun, for it grinds the masses of spirit into light, and so there is a continual flow of light from it, and of spirit to it. Does this influx to and efflux from the electric globe cause small bodies to accede towards it; so the influx and efflux to and from the sun, causes the heav'nly bodies to incline that way: so that here we have a specimen of the cause and manner of gravitation. Farther; since the electric light is convey'd at any distances, thro' a medium proper to receive it; does not this prove, that nature is full, so that there is no absolute vacuum in it? I cannot stay to explain the various and curious particulars; but would just give

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an account of one general rule that obtains in these experiments. 'Tis this, that an electrified body generally attracts (as 'tis term'd) a non-electric one; but it repells (as 'tis call'd) an electric body. The cause is this. As soon as a small body touches one that is electrified, itself partakes of the electric light, and is fill'd with it; and therefore immediately recedes along with the electric light that is flowing out; but when this small body by degrees, or by any other accident, loses its electricity, then 'tis driv'n in again by the spirit that is flowing towards the electrified body.

Thus you have a specimen of the manner in which the expanse acts, in a variety of very extensive particulars: the philosopher knows how vastly extensive they are; to how many of the appearances of nature they are applied; and therefore if the general laws that obtain in nature, are fairly, mechanically and intelligibly accounted for by the scheme of revelation; then all those branches of natural philosophy, to which these general laws reach, are so far accounted for. If any should ask, how it is possible for this one general cause, this one uniform expanse, to account for the motions of the earth, the moon, and the planetary orbs, which are so very various? I would answer, in the same manner that the one uniform law of gravitation, after a projectile force

force is giv'n, can do it. This the present philosophers very judiciously explain upon mathematical principles; while the philosophical principles of revelation afford us a mechanical account of the causes of the *vis inertiae*, and of gravitation: and thus revelation gives the finishing stroke to all their enquiries and deductions.

Give me leave to make one more remark. If these properties of matter and laws of motion, appear to arise from this extensive cause, *the expansion of the heav'ns*; then the various effects and appearances that follow from thence, ought not to be any longer ascribed to a *vis inertiae*, or to any attractive or elastic powers, but to the agency of the heav'ns. For it is now evident, that these powers (so called) are neither the cause nor effect; but are only the laws, rules and proportions, according to which the expansive fluid operates.

I might proceed to enquire into the nature, and assign the causes of many other phænomena, such as *fermentation*, *suction*, the *transmission*, *reflection* and *refraction* of *light*, the *formation* of *colours*, the motions of the *wind*; the nature of *sound*, the manner in which *vegetable* and *animal* life are upheld and supported, &c. all which may be clearly explain'd upon the foregoing principles; but these things would run me into too great a length; and therefore I shall contentedly

tendedly stop here: hoping that as soon as the philosopher sees and admits that the expansion of the heav'ns produces all the foregoing effects, he will be very readily inclin'd to believe that the same general cause reaches to these other particulars: for I am fully perswaded, that if the philosopher would take as much pains in applying these scripture-principles to the appearances of nature, as he has taken in investigating and applying his general laws of motion; he would find new truths continually rising, would philosophize with peculiar success, would receive a clear and delightful satisfaction, as he passes on in his enquiries; and would be safely guided into the secrets of nature, so far as it would be any way useful to him.

Let me then conclude this part of scripture-philosophy, by collecting together the evidence, and laying it before the reader in one view. What I have here to offer is, to shew that *Reason*, *Scripture* and *Experiment* all unite to establish this scheme.

1. This scheme is most *reasonable*. Had not the present systems of philosophy appear'd unreasonable to me, all this labour would have been spared; for I should have searched no farther. But is it reasonable to imagine that dead, unactive matter should have a power to continue a motion giv'n it, to infinity; when there is nothing continually to impell or drive it forward? But surely no-

thing can be more agreeable to reason than to suppose, that it is impell'd and driv'n forward by an external force, so long as the motion lasts.

Is it reasonable to imagine that any particle or atom of matter should of itself be capable of repelling or driving another particle at several distances from it, when itself has no existence any farther than the surface of its own body? Can it be reasonably thought, that any piece of matter should have a power to attract or draw in other matter to it at great distances; when itself has no being but where it subsists: and how can it act where it does not exist? But surely nothing can be more reasonable, than to suppose, that there is such a medium in nature as can, and must in such circumstances act in such a manner as to produce the visible effect.

Again, is it reasonable to conceive that the sun should every moment send out an infinity of rays of light for the space of 5000 years, and itself be not exhausted or diminished, and yet receive no supply? But surely nothing can be more reasonable, than to conceive that as there is a continual efflux, so there should be as constant an influx.

Again, can it be thought that there is an absolute vacuum almost throughout nature, when we know that there is not the least visible part of open space, but has a vast number of particles of light in it? Or that the
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heav'nly bodies should continue in motion with exactly the same degree of velocity for 5000 years, and meet with no resistance to retard their motions, when they are every instant striking against innumerable particles of light; each of which, according to our philosophers, must have in itself some power of resistance? But I forbear, lest my objections should be thought to arise from prejudice. Only I cannot but say, that such things as these have occurred to my mind as insuperable difficulties; and these were the only reasons that compel'd me to make a farther search.

But now how consonant is it to reason to apprehend, mere matter to be dead and inactive, to have in itself no powers either of resistance or attraction; and that it only acts by mechanism or contact.

Herein lies the peculiar *perfection* and completeness of reveal'd philosophy, in that it actually ascribes no properties to dead matter, but what necessarily arise from the consideration of its very nature. And indeed this is the very thing that a truly philosophical mind seeks after; namely to have such a conception of the works of nature, as to see the whole clearly consistent with the nature of matter, and founded upon it, without being obliged to have recourse to hidden qualities, or ideas that cannot be regularly explain'd: for until the philosophical mind can see so

far as this, it never comes to a clear satisfaction : and when it arrives thus far, it can desire no more.

Let me add, on the contrary, that herein appears the great *imperfection* of all human schemes, in that the philosopher is inclin'd to imagine unknown and inexplicable properties to be in matter, and finds himself obliged to stop here, because he can proceed no farther. Nay, if revelation had ascribed the agency of nature to attraction, repulsion, elasticity and the like ; and had asserted or suggested that different atoms of matter have in themselves these different active properties ; we cannot but imagine that the reason of man would in that case have strongly protested against it, and urged the *deadness* of matter in itself, as an insuperable objection against such a scheme.

2. This scheme is most *scriptural*, and gather'd purely from thence. Revelation takes nothing for granted, but what our own reason would naturally suggest to us, from the deadness and inactivity of matter. Now let us see how the scriptural evidence rises : and we cannot but remark how every particular that scripture asserts, seems almost to prove the whole. Does revelation direct us to the heav'ns for the general cause, and tell us the effects that the heav'ns produce : must not this one thought lead us to look into the cause, and compare it with the effects, and to receive

ceive such an apprehension of the nature of the cælestial æther, as shall suit to the effects ascribed to it: and now how clearly does it appear that the heav'ns, thus understood, can and do produce the effects.

Again, does revelation tell us that the Heav'ns are exceedingly large, fine, pure, strong, and in perpetual conflict; can we now be at a loss to know how that which has these important properties is capable to perform the office assign'd to it; and will not reason, by a little enquiry and contemplation inform us, what the heav'ns must be, and how they act: and indeed can any other way be invented (than what has been described) that shall account for these great properties and powers in the heav'ns?

Again, does revelation inform us of a circulation in the Heav'ns, a perpetual influx to and efflux from the center; and should not this discovery be look'd upon as giving us a general clue to conceive of the operations of such a glorious circulating agent?

Again, does revelation speak of the finer and coarser æther; of light and spirit as mutually acting upon each other and upon all other matter; and can we now be perplex'd in our conceptions of the manner in which motion is produced and continued?

Again, does revelation give us an account of a *fire* at the center and a *density* at the circumference, and of spirit and light, as

acting all along between the center and circumference; and can this declaration fail of leading our thoughts into this plan of nature's operations?

Again, does scripture tell us of *mechanism*, and of *expansion* and of *compression*; and is it possible for us to conceive of compression, but by expansion: and of expansion but by compression, so as to make both to be mechanical? and is there any possible way of apprehending the manner of mechanical compression and expansion, but by conceiving all nature to be full of matter finer and grosser; and that these two are in continual conflict and commotion?

Now then, since each of these particulars may be thus far improved, what shall we say; how can we hesitate? when all these and several other particulars are expressly declar'd; and when it does not appear that any one passage seems in the least to contradict the general plan. Especially if we add,

3. That this scheme is consistent with all *experiment*; and clearly assigns the proper cause of the grand appearances of nature. Here I might collect a vast variety of particulars together, and show how all tend to confirm the scheme. All our senses, particularly our seeing and hearing, concur to establish the whole: our sight informs us of the existence and operation of light every where; our ears tell us, that there is such a fulness

fulness in nature as to convey a vibration of the air all around.

All that we see and know proclaim an universal contact, influence and motion. But as I have already accounted for some of the most difficult parts of natural philosophy from these principles, this may well be presumed to be a sufficient confirmation from experiment.

Yea, let me presume to add, in the 4th place, that the attempts philosophers have made to account for gravitation and attraction unite to confirm the plan of revelation. For whenever they have aim'd to explain the causes of these phænomena, they have always turn'd their thoughts to one or more of those very agents which the scripture mentions. Some philosophers speak of a subtil *spirit*, which pervades all things ; others fix their thoughts upon the *light*, imagining that to be the prime agent in nature, as consisting of particles infinitely small, and naturally repulsive. Others have maintain'd that *fire* is the chief active operative principle ; and some have spoken of and argued upon an elastic or *expansive* force. And doubtless each of these laborious and ingenious philosophers, had some pleasing expectation in his mind, that he should be able by degrees to give an intelligible and rational account of things, upon his own principles. But divine revelation explains the nature of each

of these agents, describes the way and manner in which they operate upon each other; shows how they all subsist together in a mechanical system, upholding each other in a mechanical way: and thus an account of the agency of nature is compleated. If then the wisdom and sagacity of our philosophers, have induced them to hope that the phænomena of nature may be explain'd by recurring to such agents as these; surely this cannot but raise a proportional expectation in the impartial reader, when he sees that these very things are mention'd in scripture, their nature defin'd, the most important effects ascribed to them, and the manner of their agency upon each other, and upon all other matter, sufficiently set forth. Since then all this is declared and attested, by a revelation that has every mark of truth and divinity upon it; nothing can be a stronger motive to a diligent and studious search, or a firmer ground to hope for success in the enquiry.

Upon the whole; if this scheme of philosophy be so rational in its nature; so scriptural in its foundation; so consistent with experiment in its application; and receives such confirmation from the wisdom of man, as well as from the word of God; why should it not be readily, clearly and thankfully embraced? No objection surely ought to be made against it, because 'tis derived purely from revelation. But all the excellency of it,

it, and all the wisdom, power and goodness that appear in it must be ascribed to the great author of all things ; while all the knowledge we have of it, must be originally ascribed to his most valuable word ; which now, I trust, appears to be the only infallible guide both in natural and spiritual things.

C H A P. VI.

Concerning the Earth and Waters.

HERE have been several theories of the earth, and of the flood invented and proposed to the world ; but there is great reason to think, that the scripture has not been sufficiently attended to. The design of this chapter is to produce in one view the whole or entire substance of what revelation informs us concerning the earth, in a philosophical way. The best method I can think of, is to go on with *Moses's* regular account in the first chapter of *Genesis* ; and introduce what is said in other parts of scripture, by way of illustration or confirmation as we proceed. And we have now a special advantage towards explaining what *Moses* says concerning the earth ; having already from scripture obtain'd some clear ideas of the several parts of the heav'ns, which are mention'd and mix'd along with the accounts of the earth in the first chapter of the bible.

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We have seen with what regularity and order Moses speaks of the heav'ns, mentioning, 1. The *matter* of the heav'ns in general, as created. 2. The *darkness*, as the condition in which the Heav'ns were, immediately upon creation. 3. The *spirit*, as in a tremulous motion. 4. The *light*. 5. Then the *expansion*, which arises from the mutual action of light and spirit: then, 6. The *luminaries*, or bodies of the sun, moon and stars. The same beautiful order we shall presently see is observ'd concerning the earth: for he first mentions the matter of the earth as created; then, 2. the condition or situation it was in immediately upon creation, *without form and void*: then, 3. the waters: and, 4. the division between the waters above and below the expanse: then, 5. the appearance of the dry land: then, 6. the vegetation of the earth, 7. then the influence or government of the heav'ns over the earth: and then, 8. the vegetation of the waters: next the production of animals, and last of all the creation of man. We shall have occasion now to speak only of the first 5, or 6. of these, in their order.

1. The *matter* of the earth is said to be created or brought into existence by the immediate power of God, Gen. i. 1. *God created the substance of the heav'ns, AND THE SUBSTANCE OF THE EARTH.* VeETH HaARETS. The very same remark that has been already made upon the particle

particle ETH holds as true of the earth as of the Heav'ns : and therefore no more need be said here.

2. Here is mention'd the *condition and position* which the matter of the earth was created in. Ver. 2. *And the earth was without form THoHU AND void BoHU.* These two words THoHU and BoHU have occasion'd much perplexity ; and the meaning of them does not seem to be so clearly ascertain'd in scripture ; but we are to gather the signification of them, from a general view of this subject. 'Tis my opinion, that our translation has giv'n very nearly the right explanation : for certainly, 1. the matter of the earth was *without form*, unform'd or in loose atoms at first, as were the heav'ns : all the atoms of matter of which the whole ball of the earth is composed, were in a confused *chaos* of loose atoms, mix'd together without any regular order. And very probably. this is intended in what we read Isa. xlvi. 18. where 'tis said, that God himself form'd the Earth, made it and machin'd it : *and that he created it not in vain.* But the word translated *IN VAIN* being the same, namely THoHU, as in *Genesis* i. 2. may incline one to think, that it may be render'd by way of question thus. *Did he not create it in loose atoms ?*

2. The matter of the earth was *void*, empty or hollow ; 'twas in a sphere or globe of loose atoms, which had a vacuity in the middle ; or 'twas a concave sphere, of mix'd matter.

matter. And altho' a *concave sphere* is so regular a form, as does not well suit to our notion of a *chaos*; yet as this was a concave sphere of *mix'd matter*, containing the different elements of things in the utmost confusion, it may upon that account be term'd a *chaos* or *chaotic mixture*.

That there was such a concavity in the middle seems very probable from what is said ver. 9th. *Let the waters under the heav'n, namely those which cover'd the earth, be gather'd together into one place, and let the dry land appear*: now we cannot conceive where these waters at the surface of the earth went to, unless into the earth; which must therefore be hollow in order to receive them.

Moses farther adds, ver. 2. that *darkness was upon the faces of the DEEP THeHOM*. If by the deep in this place we are to understand the same that is meant by the word in most other places, it should intend the vast collection of waters, that is, in the bowels of the earth. But these not being as yet form'd, I am therefore ready to imagine that the word *deep* signifies in general, a confused fluid of matter: such is the deep that is now in the bowels of the earth: and such was the *chaos* as just created. So then, by the deep we may understand the chaotic mixture, just described. Now darkness, which was the heav'ns in their first condition, was upon the faces of this *deep* or confused fluid mixture: and as this *chaos* was hollow in the middle, so the darkness,

darkness, was upon the surface both within and without.

3. The next thing we read of is the *waters*: for it is added, *the spirit of God moved upon the faces of the waters*.

That is, the darkness was by commotion form'd into spirit: and this spirit began to separate the earthy parts of the confused mixture, from the watry parts: and so it is said to be in a tremulous motion upon the faces of the waters: and now there were waters both within and without, within the hollow sphere towards the center and without upon the outward surface: But this will be farther confirm'd in a succeeding paragraph. The next thing *Moses* mentions, ver. 3, 4, 5. is the forming of light, and dividing between the light and between the darkness, and God's calling the light day and the darkness night: upon which I have already remark'd, that here began the diurnal revolution of the earth: But this must be reserv'd till we come to consider the figure and motion of the earth.

4. The next step in the formation of the globe, was the *division of the waters*, by the firmament. The heav'ns being form'd into the condition of spirit and light; from hence ensued an expansion: and the first work the expansion was employ'd about was to operate upon the waters. Ver. 6. *And God said let there be an expansion in the midst*

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of the waters to divide the waters from the waters. How the expanse work'd to form a division is easily conceived; for as the heav'ns were now in expansion; it follows that it work'd both within and without. The expansion within separated the earth from the water on the inner part of the concave sphere; and the expansion without did the same upon the outward surface of the sphere: so that there were two waters, the one within and the other without, and the crust of earth was between both. And thus the expanse produced a division between the waters above the firmament, and those below the firmament, by the intervening crust of the earth.

To make this as plain as I can, let it be express'd or conceiv'd thus. In the center of this hollow sphere, there was a part of the heav'ns in expansion; next above that were the internal waters; next above that was the crust of the earth: and above that all over the surface of the earth were the external waters, next below the expansion of the heav'ns, that were without the earth. Accordingly we are told, ver. 7. that *God made the expansion, and so divided the waters which were under the expanse from the waters which were above the expanse.* The chaotic mixture was now put under the operation of the expanse; and by it the several kinds of matter were sorted regularly, which before were

in

in a confused mixture : and as the expanse worked both within and without, it follows that the crust of earth was between : and so the waters under the expanse, (namely those without under the open expanse) were separated by the earth from the waters above the expanse (namely those within the earth which were actually above the expanse at the center). Thus we see what were the waters above and beneath the firmament : and to this original position of things the Psalmist alludes *Psalm. cxlviii. 4, 5. Praise him ye waters that (were) above the heav'ns, for he commanded and they were created.* Let us remark, as we pass on, that 'tis upon occasion of this division of the waters, that the expanse receives the name of the *heav'ns*, ver. 8. and very properly ; for the expanse having already placed things in such order, and having sorted the different parts of the globe, is therefore justly call'd SHeMIM the *placers* ; and from hence forward it became the *placers* and *disposers* of all things in the material system.

But should any doubt whether this interpretation of the two waters above and below the firmament be just ; let him attend to what is added, ver. 9. concerning

5. The *appearance of the dry land* ; and God said, *Let the waters under the heav'n be gather'd together into one place, and let the dry land appear.* The waters under the heav'n must

must be those that cover'd the earth and prevent'd the appearance of the dry ground: these waters are order'd to be gather'd together into one place: i. e. to unite with the other waters; so that both should be together, and one place hold them both. So, when these waters upon the surface were removed, they went into the earth and join'd with the other waters there, which are call'd the waters above the firmament: and from this time the Earth was fill'd with waters, and the dry land lay upon their surface.

This whole account of the separation of the waters and their being afterward collected together, is confirm'd and illustrated by the Mosaic account of the flood, Gen. vii. 11. *when the fountains of the great deep were broken up.* The great deep is no other than this vast collection of waters in the bowels of the earth: these were then caused in a miraculous way to come out and overflow the earth. This thought accounts easily for the universal deluge, since we are now inform'd where such a body of waters could be found as to overturn the whole earth. While the flood lasted, the earth and waters were reduced to the same situation as they were in at the creation, just before the waters were order'd to unite, and let the dry land appear. And that the earth was thus placed between the waters, at first; and that it was by these waters the flood was produced; can not

not be denied if we read 2 Pet. iii. 5, 6, where 'tis very express; *by the word of God, the heav'ns were of old and the earth standing out of the water and in the water; whereby the world that then was, being overflow'd with water, perished.*

All the other places, that speak of the deep or the waters in the bowels of the earth, are illustrated by the preceeding account; and they join to confirm it in every part: let us take the passages in the order as they are found in the bible. In the second commandment *we read of the waters under the earth.* In Deut. xxxiii. 13. we are told that *the deep coucheth beneath.* In Job xii. 15. we are call'd upon to admire these two great works of God, his fixing the waters within their bounds at the creation, and his causing them to come out at the flood. *Behold he withholdeth the waters and they dry up; he also sendeth them out and they overturn the earth.* And his constantly making them keep their bounds is exprest Job xxvi. 10. *He compasseth the waters with bounds, until the day and night come to an end.* See likewise that beautiful account of the nature, cause and conclusion of the deluge, Job xxxviii. 8, 9, 10, 11. *He pour'd out YaSeCH the sea thro' doors, when it brake forth; as it issuest out of the womb: when I made a cloud its garment, and thick darkness its swadling band: and then I brake up for it my decreed place, and set bars and doors, and said, Hitherto shall*

thou come, but no further, and here shall thy proud rolling waves be stay'd. And then, referring to the gathering of the waters together into the earth, at the creation, or at the conclusion of the deluge, 'tis said Ps. xxxiii.

7. *He gathers the waters of the sea together in a heap, and lays up the deeps in store-houses.*

And now I would hope that the reader has some clear conceptions of the *mosaic* account of the earth. That it was created in loose atoms, and in a concave sphere of mixed matter; the matter of the waters and the earth being a confused chaos hollow in the middle: that next, the spirit, light and expansion began to work and divide the earthy from the watry parts of the globe. The expanse within separated the waters from the earth within; and the expanse without separated the waters from the earth without, and so produced a crust of earthy matter between both these waters: the waters within were those call'd the *waters above the expanse*; and the waters without, were those call'd the *waters beneath the expanse*. Next, the waters without under the expanse were made to rush into the earth, which was hollow; and so united with the other waters within: and thus the earth is fill'd with water; call'd, perhaps, the fulness of the earth. Ps. xxiv. 1. At the beginning of the flood, the expanse miraculously rushed in and drove out the waters, and they cover'd the earth; and at the con-

conclusion of the flood returned to their proper place; and there they are to this day.

What remains, is only to explain those passages which seem to speak against, and those which really speak for the globularity and the rotation of the earth: which are such as mention. 1. The foundations. 2. The pillars. 3. The ends. 4. The breadth. 5. The wings. 6. The position of the earth.

1. Of the *foundations* of the earth. We often read of God's founding or laying the foundations of the earth; from whence some may inadvertently imagine, that the earth itself must stand still, as being fix'd upon foundations. But we shall presently see, that this is a mistake: for 'tis not the whole globe of the earth, that is said to have foundations, but only the earthly parts of the globe, which are placed upon the waters. This I learn from *Psal. xxiv.* 2. *The earth is the Lord's, &c. for he founded it upon the seas and machin'd it on the floods.* Where the earth is evidently distinguished from the seas, and said to be founded upon them: so that in reality the waters are the foundations of the earth: which is confirm'd by several other texts. In *Prov. viii. 27, 28, 29.* God's setting a compass upon the face of the deep, his strengthening the fountains of the deep, and his giving the sea his decree, that the waters should not pass his commandment, are all clearly and closely connected with his appointing the foundations of the earth. And from this thought we

have a clear and lively explication of what is said, Psal. civ. 5—9. *He laid the foundations of the earth, that it should not be removed for ever:* this I conceive was more properly done at the deluge than at the creation. Because the earth's foundations that were laid at the creation, were removed at the flood. But since that time, *these* foundations are never to be shaken, 'till the dissolution of all things. But let the *Psalmist* go on to explain himself. Vers. 6. *He cover'd the earth with the deep as a garment;* which was done at the flood: then as it follows the waters stood above the mountains: then at his rebuke they fled, and with a great noise and confusion, at the voice of his thunder they hastened away: then the waters went up by the mountains, and descended by the vallies, unto the place he had founded for them: for it follows, vers. 9. *thou hast set a bound that the waters should not pass over; that they turn not again to cover the earth;* and thus the foundations of the earth were laid afresh. We read likewise of God's expanding the earth. Isa. xlvi. 5. xliv. 24. how that was done, we are inform'd in Ps. cxxxvi. 6. *He stretch'd out or expanded the earth over the waters.*

'Tis proper in this place to take notice that we read of the *sockets* and *corner stone* of the earth. Job xxxviii. 6. *Whereupon are THE SOCKETS THEREOF ADANIAH fasten'd, and who laid the stone of its corner.* The general meaning of which expressions seems to be

be this. *How are the parts of the earth kept together?* for it appears from the above description, that the earth is stretched over the waters like a vault or arch : Now a vault has sockets and a key-stone to keep it from falling in.

2. Of the Pillars of the earth. From this phrase likewise some have thought that scripture would have us conceive, as if the earth could neither be a globe, nor have any motion : But 'tis a mistake. For the pillars of the earth signify, the compressors of it ; or that which compresses the parts together, as it should be render'd 1 Sam. iii. 8. *For THE COMPRESSORS MeTSUKI of the earth are the LORD's, and he hath set the world upon them.* The other word NGaMUDIM, which is translated *pillars* in Job ix. 6. and in other places signifies SUPPORTERS, that which supports the earth in its present condition : *these supporters are said to tremble :* which is true of them, whether we understand the place, Job ix. 6. of any thing miraculous, or of what is true in the ordinary course of nature. For we have already learn'd enough of the heav'ns to know that they are the compressors and supporters of the earth.

I have before me all the places where the earth is said to be established or to be stable, that it should not be removed ; which I shall not trouble the reader with ; and shall only make this remark upon them. That the

word render'd to establish or make stable, is CHUN to machine or place every part in proper order: and the word render'd to move or remove is MUT, which signifies to displace or dissolve, and this is denied concerning the earth: so that all the meaning of such phrases is, that the parts of the earth are so machined or placed together, that they shall never be dissolved, as they were at the deluge.

3. Of the ends of the earth: this phrase does not intend to teach us that the earth is long or flat: for the ends of the earth often signify the extremities, borders, or surface of it; as will be evident from such places as these, Job xxviii. 24. *He looketh out to the extremities of the earth and sees under the whole heavens:* Psal. cxxxv. 7. Jer. x. 13. *He caused the vapours to ascend from the extremities of the earth.* Prov. xxx. 4. *He made all the ends of the earth to rise up, or emerge out of the waters.*

4. Of the breadth of the earth. The scripture speaking of the whole globe says, Job xxxviii. 18. *Hast thou perceiv'd the Breadths Ra'HaBI of the earth?* The word *Breadths* being plural, may possibly intend the two diameters of it, namely that which reaches from pole to pole; and that which extends from one side of the equator to the opposite. And when it speaks of the earth as distinct from the sea; it very properly calls it long, Job xi. 9. *The measure thereof is longer than the earth and broader than the sea.* Now this

this is a very exact allusion, for whoever looks upon the terrestrial globe, will observe that the earthy part of the globe is long; namely, from pole to pole: and that the watry part of it is broad, namely, from east to west.

But that the earth is circular or globular according to scripture, seems evident from Isa. xl. 22. *He sitteth upon the CIRCLE HUG of the earth.*

After all you will say: are there any intimations of the nature and cause of the motion of the earth: its annual and diurnal revolutions? I answer: as it is now clear, that the foregoing places of scripture do not intend any thing contrary to its motion; so there are several expressions of revelation which are evidently for it: and these places not only assert or intimate the motion; but assign the cause too. But this leads me to consider,

5. The *wings* of the earth. 'Tis possible that some readers will be surprised at the mention of this phrase, because they cannot recollect any thing of this nature in the Bible; but the only reason is this. Our translators, not apprehending that the Holy Ghost had any intention to speak of the motion of the earth, have therefore giv'n a translation, which is not quite literal in the case before us: but yet it must be acknowledged, as a proof of their learning and integrity, that they have giv'n the literal rend'ring in the margin. The scripture mentions the wings of the earth

expressly in two distinct passages. One is Job xxxvii. 3. HIS LIGHT AORO is UP-ON THE WINGS NG_aL CaRPHOTH of the earth. From which place 'tis clear that the earth has wings, and why wings should be attributed to it, unless it did move or fly, is hard to conceive.

The other place is in Job xxxviii. 12, 13, 14. which should be render'd thus, very little different in words from the present translation. *Hast thou commanded the morning since thy days, or caused the day-spring or dawn to know its place TO TAKE HOLD LeE'HOZ ON THE WINGS BeCANPHOTH of the earth, that the wicked might be shaken out of it? It is turn'd as clay to the seal, and they stand or support themselves as a garment:* namely as a garment is fitted to and is supported by the body that wears it. In which place, we have not only the phrase, *the wings of the earth*, but have an intimation that these wings move and carry on the earth in its revolutions. The meaning of the place I take to be this, upon a diligent search into it.

JEHOVAH gives Job a challenge to this purpose. " Hast thou a power over the regular returns of morning and evening; dost thou cause the earth to revolve; and hast thou a power to take hold on the wings of the earth and shake the earth out of its regular motions, to the confusion and destruction of the wicked? Behold the morning

" morning dawn and the earth's wings are
" exactly fitted to the earth, as clay is to the
" seal, and 'tis not in thy power to make
" any alteration."

To these strong intimations of the earth's motion, it may not be improper to add Psal. xcvi. 11. *The heav'ns shall rejoice or SHINE YISHMeHU and the earth shall be glad or REVOLVE THaGeL.* This translation will at first view seem forced and unnatural; but if it appears that the shining of the heav'ns is the cause of the earth's revolution, this explication may then seem more regular and rational; which I conceive may be clearly made out in the following manner.

The present philosophers acknowledge, if we can account for two things, namely, the law of gravitation and the continuance of a motion when once impressed, that these two principles combined together, will exactly account for the motion of the earth round its own axis, and round the sun: and they are likewise of opinion, that the same principles will explain the cause of the motions of the moon, and indeed of all the planets, both primary and secondary. If this sentiment of theirs were just, it would immediately follow, that what has been already said concerning the operation of the expanse in producing the power of gravitation and in perpetuating a giv'n motion, will in their opinion

opinion be sufficient to answer all these purposes: and if the reader be desirous to know how these things are, he may be referred to such astronomical books, as treat of the motions of the heav'ly bodies.

But may I not be allow'd to question whether a body once put in motion, will continue in motion *for ever* with the same degree of velocity, and in the same direction? Is there not reason to think that the motion will gradually decrease? and if so, then we cannot imagine that the earth (for instance) should have continued its revolution for more than 5000 years without some assistance. Now I conceive, that what the scripture terms *the wings of the earth* is that which affords all the assistance, that is necessary to continue its motions. Let me here then subjoin an account how the shining of the heav'ns continues the revolution of the earth.

You may remember, it has been made to appear that the expanse operates in this manner. Where there is the greatest friction or heat, there must of necessity be the strongest pressure of the spirit. As the heav'ns therefore continually shine upon the earth, this actually produces, as the earth revolves, a greater heat in the afternoon than in the morning: consequently the spirit pushes in more strongly upon the afternoon, than the morning part of the earth: and this being constantly

stantly the case, the pressure of the spirit is continually turning the evening edge away from the sun, and the morning edge towards it, and so the light is continually going into the darkness at the evening edge; and the darkness continually coming into the light at the morning edge.

Further, as there is a much greater heat at the evening, than at the morning edge of the earth, so the spirit will be continually pushing in against the evening edge, and drive the earth forward, as well as turn it round. Much more might be said upon this curious subject, but I must leave the reader to conceive in his own mind, how the push of the spirit gradually increases towards the evening, and how it is the greatest, at or near the evening edge; and he will easily see how this constant regular impulse has a double force, one to turn the earth round, and another to push it on. All this the heav'ns can do; only upon this supposition, that God gave the motion to the earth at first, and placed the sun in the center of the system to shine continually upon it. There is one more particular to be taken notice of: namely,

6. The position of the earth. There is an expression in scripture which, in my opinion, describes it to us. Job xxvi. 7. we read the place thus, *He stretches out the north over*

the south, and fills up the south with the north.

the empty place, and hangs the earth upon nothing.

But the word render'd STRETCH OUT NoTeH signifies to INCLINE AND MAKE TO LEAN ASIDE : and the EMPTY PLACE ThoHU signifies the LOOSE ATOMS : and the word translated nothing is BeLIMaH : which, if derived from BaLaM TO BIND TOGETHER, as is most natural, signifies *that which binds the earth together*. Now render the place accordingly, and it runs thus. *He causes the north to lean aside over the loose atoms and hangs the earth upon that which binds it round*: which is no other than the expanse. The earth then swi~~n~~s, as I may say, in the open expanse, and has its north part continually leaning aside. Now philosophers know, that the pole of the earth does not stand upright or perpendicular to the plane of its orbit : but it leans aside ; and this is the true cause of the variation of the seasons, of summer and winter, of spring and autumn. This cannot be represented in a few words : the shortest way to conceive it, is to look at the instrument or machine call'd an *Orrery*.

Solomon, in *Eccles.* i. 6. speaks of the variations of the seasons of the year, by the solar light going towards the south, and turning about towards the north : and mentions this light as continually attended with and pursued by the spirit. And the same general thought,

thought, that has led us to see how the diurnal revolution is perform'd by the expanse, would lead us into the method of accounting for the returns of summer and winter: since the north part of the earth is most heated in summer, and the south part in the winter.

But I chose to stop here, lest I should proceed too far beyond the reach of many readers: only upon the whole of this treatise concerning the earth; let it be observ'd, that if the heav'ns are the supporters and compressors of it; if the heav'ns roll it round; if these are the cause of day and night, summer and winter upon the earth; well may they be said *to rule over the day and night;* and in general *to have dominion over the earth:* as in *Job xxxviii. 33.*

Having thus collected and laid together the substance of what holy scripture reveals both concerning the *heav'ns* and the *earth*; I must now leave the reader, to review and consider the several parts of scripture philosophy, to lay the whole together in his thoughts, and to render it familiar to his mind; and when he has done this, and not before, will he be capable of passing a mature judgment upon the consistency and beauty of its parts, and of applying the agency of the *heav'ns* to account for the appearances of nature.

But possibly, the reader will ask; what use all this will be to him, what profit he shall reap by it, and what pleasure he shall receive

receive from it? will the delight or advantage resulting from thence, repay him for the trouble of his attention to these things? The only answer I shall give to this question, shall be what I feel in my self, as the result of this laborious enquiry; and surely I may venture modestly to promise that to you, which I have receiv'd from it my self.

1. You will, I hope, gain a clear satisfaction concerning the operations of nature; you will see what is the primary, natural cause of those various appearances that are about you; and if this be the result, surely this of itself is no contemptible acquisition. For my own part; I must say, I could not find any rest to my mind in philosophical enquiries, 'till I look'd into my *Bible*, and have now attain'd to that pleasurable satisfaction which gives quiet to the mind, and makes me look upon this scheme as far exceeding any merely human hypothesis. The infallible word of revelation lays before you the general cause, and in many instances guides you in the application of it to particular effects. You have now a special encouragement, to make observations and experiments, since now they may all be applied to the general causes, and so a particular and satisfactory answer may be received; while mathematical principles will give great assistance in computing the various proportions, according to which the heav'ns operate in various cases.

2. You

2. You will, with me, receive an additional confirmation of the truth and excellency of divine revelation. There is no necessity to cast aside other evidences for it, to obtain this ; neither would I, that any should slight or undervalue the proof that arises from, the perfection of its moral precepts ; the glory of its distinguishing doctrines ; the harmony of its different parts, and the like. But surely you will be confirm'd in your belief of revelation, and have a higher regard for it, when you can see that, it not only speaks exactly and philosophically true in natural things, but likewise contains the true principles of natural philosophy : for now all the appearances in nature may, and ought to be view'd, as giving an attestation to the truth of the *Bible* ; or at least, as concurring with it.

3. You will hereby obtain a clearer understanding of many parts of sacred writ. Several passages of scripture which appear'd difficult, will become easy, and several phrases which were obscure will be made plain. And this, I conceive will be reckon'd no small advantage by one who desires to read every part of his bible with understanding.

4. You will find a glorious illustration of many spiritual truths, and some of the noblest and grandest ideas will be presented to your view ; which will lead you into the fullest conception of divine things. This is a peculiar excellency of the philosophy of revelation.

velation. For it is very evident that there is a strict and indissoluble connection between the *philosophy* and *theology* of the Bible. 'Tis true, I have not as yet closely studied this part of the subject, but am obliged at first view, to take notice that the same words are used both in a *philosophical* and *theological* sense. Whenever therefore we find any words that are in their primary sense philosophical, applied to spiritual subjects; we are obliged to compare natural things with spiritual, which not only is a pleasant amusement; but an instructive and profitable employment.

Let me here subjoin a few instances of this nature; which could not escape my notice. And I hope every one will clear me from indulging imagination, when he sees that express passages of revelation are produced, or referr'd to.

When we contemplate the operations of the expanse, and take notice how universal is its influence, how effectual its agency; how it upholds all material things in their consistence, and continues and regulates their motions; what natural idea can give us a larger conception of the divine power? And hither revelation directs our thoughts, by calling it the *expansion of his power*, and by telling us that the *heav'ns declare the glory of God, and the firmament or expansion shows his handy work.*

When

When we cast our thoughts towards the heav'ns, and observe how they rule and govern all material things under God: how they have dominion over the earth; and how numerous the hosts of heav'n are; what nobler natural Idea can we have of the extent and efficacy of the divine government and dominion over all things, both in the material and spiritual world? To this universal government, the scripture directs our thoughts for an apprehension of the divine dominion, when it tells us that *the LORD hath prepar'd his throne in the heav'ns, and his kingdom ruleth over all*, and that *heav'n is his throne, and the earth is his footstool*: and must we not say with peculiar admiration and adoration, *Dominion and fear are with him, he maketh peace in his high places? Is there any number of his armies, and upon whom doth not his light arise?*

Again, when we contemplate the celestial æther, and conceive how exceedingly fine and how perfectly pure it is, free from all gross and defiling mixtures; is not this a most proper emblem to lead our thoughts to the absolute and spiritual purity of the divine essence? especially as revelation itself makes the comparison, and fixes upon the heav'ns as a proper illustration of it: when it says that *the heav'ns themselves are not pure in his sight.*

Would we have our hearts enlarged by a view of the divine wisdom and equity; let us behold the exactness and regularity of the operations of the expanse. For 'tis asserted that *God stretched abroad or INCLIN'D the heav'ns by his discretion.*

Thus the striking properties and powers of the heav'ns are expressly applied in scripture, to give us the finest and noblest apprehensions of the divine perfections and operations.

Shall I be allow'd to add, that the several constituent parts of the heav'ns are likewise used to answer divine and spiritual purposes. Is not the fire and especially the *solar heat*, the 'HaMaH, made the strongest Idea of the divine anger? Is not the light made use of to illustrate the sweetness and excellency of the divine favour; according to that common phrase, *the light of God's countenance?* And as the material spirit is generally the immediate agent in natural operations; how properly does this typify the *spirit of God*, who is the immediate agent in all the works of grace. And as for the darkness, none can be ignorant, that this is applied in a spiritual sense to the mind, and among other things, conveys the Idea of the absence of the tokens of the divine favour and influence. I find no spiritual application made of the density at the extremity of nature; unless it be under the phrase outer darkness τὸ Κύρτον εἰς γένεσιν in *Mat. viii. 12.* and elsewhere:

and

and this probably refers to the darkness at the very edge of nature ; and if so, is a very striking Idea of the unhappiness of those, that are *banished with everlasting destruction from the presence of the Lord and from the glory of his power.*

These thoughts, I say, could not easily escape observation, as I passed on in the pursuit of an enquiry purely philosophical : and may we not from these brief instances see, that the natural philosophy of revelation is very subservient to the divinity of it ; and that in many particulars these two are link'd together ? Surely then, this is an excellency belonging to the scripture-account of natural things, which must recommend it to us; and give it a precedence to all other schemes.

is now in the state of affairs: Västergötland and Östergötland have joined to give birth to a
state in which there is no longer any
regional autonomy and between one land
and another one there is a kind of
competition, as if they were
villages too little apart. In each other's sight
they are no longer than a single town or a
large village, where everyone can go to
see someone's land and another's. And
as a consequence the villages are becoming
smaller and larger, and the population is
increasingly scattered. And this
population is at first poor, then
leaving to find a more plentiful soil or good
husbandry, it becomes more and more
numerous and scattered, and so on.

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APPENDIX.

IT has employ'd the thoughts and pens of the most celebrated philosophers to invent and exhibit a rational account for the universal law of gravitation, which is so apparent throughout all nature, and acts in such regular and exact proportions. They seem all extremely desirous to find out, and assign the cause of it. The great Sir *Isaac Newton* himself, and several succeeding philosophers of great ingenuity, have been solicitous about it : some taking one method and some another. And since this foregoing treatise was finished, and transcribed for the press ; a treatise written by the ingenious and laborious *Cadwallader Colden*, has appear'd in the world, and unexpectedly has come into my hands, upon this very subject. I must beg leave therefore to make some candid remarks upon it ; without the least intention to detract from his honour ; or from the reputation, that others have obtain'd by their laborious searches into natural philosophy. So far it is from my intention to do this, that, in truth, I rather stand amazed at the great extent of their capacities, their

learning and experiments. And really think they have penetrated into the nature, and the cause of gravitation, perhaps as far as mere reason could possibly attain, without revelation. I hope therefore it will not be esteem'd any real or design'd reflection upon them, if I attempt to offer some observations, with the bible in my hand and its philosophy in my mind, on purpose to finish with this assistance what they appear to me to have left imperfect.

Now then, since these learned and ingenious authors, have made such essays to exhibit the true cause of gravitation; it is very apparent, that to say gravitation is the cause of the grand appearances of nature, is not a sufficient answer to an enquiring mind. For it still asks, What gravitation is, what is the cause of it, by what agents is it produced? The foremention'd *Cadwallader Colden* has, with great assiduity and penetration, attempted to answer these questions.

He has very justly observ'd, page 17. That "nothing can act where it is not, and therefore nothing can communicate its action to any other thing which is at a distance from it, but by the intervention or communication of some middle thing or medium, which extends from the one thing to the other." This proposition is so self-evident, that I apprehend it needs no manner of proof, when 'tis once truly understood and duly

duly consider'd. Upon this principle therefore we must go, in all our accounts of natural agency. The only question that remains is, what kind of *medium* that must be, that should produce the gravitation of one body towards another, at various distances.

Mr. Cadwallader Colden, in order to describe this *medium* aims to prove, that there are three sorts of matter in nature, essentially different from each other. 1. Such matter as has in itself only a power of resistance. 2. Such as has a power of self-motion or of moving itself, but no power of resistance. 3. Such as has in itself an elastic or expansive force, but has neither resistance nor self-motion. By the mutual actions of these three sorts of matter one upon another, he attempts an account of the cause of gravitation. He supposes all nature to be fill'd with an elastic æther, except where resisting bodies (such as the sun and the planets) are; and asserts that if the elastic æther be put into commotion by the moving power, a gravitation towards resisting bodies will necessarily ensue: this he *asserts*, did I say, I may venture to add, this he *proves*, explains and applies in a rational, mathematical way. But tho' thus much be acknowledged, yet I may take leave to observe, that the account is not compleat; for the philosophic mind may as well rest satisfied in *gravitation unex-*

K 4 plain'd,

plain'd, as in the three powers of *resistance*, *self-motion* and *elasticity* unexplain'd.

But is it indeed true, that there are three sorts of matter with these three distinct properties? 'Tis from hence very easy to collect, that neither of these properties or powers belong to matter as such; neither of them then can result from the nature and existence of matter; for if either of them did, then all matter must necessarily be either resisting, or self-moving, or elastic; which the supposition of this ingenious author entirely contradicts.

It will I hope presently appear, that no such powers or properties belong to the essence of matter; but that these powers result from other causes and considerations. For, 1. No particle of matter can be *self-moving*, or be endued with a power of moving itself; to suppose this is to make matter a *living* and not a *dead* thing.

2. No particle of matter can be of itself *elastic*, because as it is in itself absolutely dead and unactive, it can never rebound or return a motion imprest upon it; neither,

3. Can it have in itself a power of *resistance*, because it being dead, is merely passive, and therefore can only passively receive a motion imprest, but has no power to stop or prevent it, unless it be obliged to move some other matter out of the way, in order to receive the motion imprest. And farther,

farther, that which is of the essence of a thing cannot be conceiv'd to be either less'n'd or enlarged : now 'tis easy to conceive it possible for one particle of matter to have in it a greater degree of resistance than another of the same size ; and therefore its degree and power of resistance must arise from some other cause, besides its own nature and existence. Casting aside therefore all these powers as belonging to the nature of matter ; let us, before we proceed any further, conceive what properties belong to matter *as such*. The only regular method to know this, I apprehend, is to fix our thought upon one particle or atom of matter, and observe what Ideas are necessarily contain'd in that conception. 1. We cannot conceive of matter without having an Idea of some *extension*: every atom of matter must therefore have dimensions, or must be of some magnitude. 2. We cannot conceive of matter without *solidity*, for if one particle of matter can penetrate the dimensions of another, we lose the Idea of its existence : and for the same reason that two particles of matter may occupy the same space precisely at the same time, we may conceive 200 particles, to be all within one another in the very same space; besides, if one particle of matter could penetrate the dimensions of another, they could make no impression upon each other by contact. 3. We cannot conceive of matter, with-

without having an Idea of some *figure*, therefore every particle of matter, must be of some particular figure or shape, as well as of some particular size or magnitude. 4. Each atom or particle is entirely *passive* and dead, and is therefore capable of receiving motion or of being moved: but cannot move itself without some external cause. I might proceed to observe that no part of matter is capable of changing its own form, or of lessening or enlarging its own size, because it is absolutely dead and unactive of itself: if ever therefore it has motion, or has its form or size alter'd, it must be by some external cause.

This account of the essential properties of matter, I submit to the judgment of the reader: while I will venture to affirm, that until our explication of natural causes penetrate so far, as to leave us under no necessity of inventing properties to matter, which do not necessarily arise from its nature; we still fall short of a clear account of things; because then it will still be ask'd, How came dead matter to have such active properties belonging to it? And we may as well rest contented in the unaccountable active property of *attraction* and *gravitation*, as in any other.

But to return. As this penetrating author has made it appear, that the three foremention'd principles will account for gravitation and

and other phænomena : if the scripture-plan will fairly account for his three principles, then the whole must necessarily be plain and clear, and there will be no necessity of recurring to three distinct hidden, unexplain'd qualities, as he does.

Now let the reader recollect what has been proved and illustrated from revelation, and he will see,

1. How any matter comes to have a power of resistance ; namely, because it exists in a *medium* that is confin'd at its extremities all round, and therefore no body can move in it, without pushing against and moving aside that part of the *médium* that is contiguous to it.

2. He will likewise see how any matter has a power of motion ; namely, because it exists in an expanse that is in constant com-motion. By this means as I may say, all nature is alive or in action ; by the constant influx of masses, from the circumference of nature towards its center, and the continual efflux of atoms from the center towards the circumference ; so that 'tis the same in effect, as if most or all of the particles of matter in the heav'ns had a power of self-motion ; for all the parts of the expanse are necessarily in motion and conflict.

3. The reader will likewise see how all nature is fill'd with an elastic force. For in reality it will be found that an universal expansion and compression, is no other than an universal elasticity

sticity in constant agitation. This may be proved from several considerations: I will in this place mention only these two. 1. The very term I choose to make use of, namely *expansion*, is undesignedly used by Mr. *Colden* himself. He calls the force of nature, the clastic or *expansive* force of the æther, in page 20, and in several other places: and by all philosophers in general, the expansive force of the air is call'd its *elasticity*. And no wonder that the names should so undesignedly coincide, when, 2. The *things* themselves are the same. What is the nature of *elasticity*? It is a springiness which most bodies have, more or less; or a power to return to its former place or condition, when bent or compress'd. The air of the atmosphere has this property belonging to it, in a very sensible and remarkable manner; for, being compressed, it endeavours with great force to restore itself to its former state. Now how evident is it, that this is exactly true of the scripture-expans. For the light and spirit in commotion are continually expanding and compressing each other: so that if by any force, in any part of the heav'ns, the æther is made either finer or grosser than it otherwise would be, it endeavours with a proportional force to restore itself to its former state.

Now then, if the three first principles of Mr. *Colden* are exactly accounted for from revelation; and if these three principles will account

account for the grand appearances of nature especially for the universal law of gravitation; it follows that the very same principles united in and explain'd by the scripture-expansive, will equally account for them.

Give me leave, in this place, to enlarge a little upon the expansion of the heav'ns, in order to set the subject in various lights, and show the fitness of this agent for the work assign'd it. Let the reader attentively review what has been collected from revelation, and is found in page 71—76. where he may see how an universal expansive was produced at first, and is mechanically continued: and then he will easily see that the expansive may be set forth in these various lights.

I. There is in the heav'ns an universal commotion, particles of matter moving in every direction in each part of the heav'ns. For tho' the prevailing course of the light or atoms is from the *solar-fire* outward, and the prevailing course of the spirit or masses is from the *density* inward, yet these two striking against one another in their passage, make motions sideways in every direction, by reason of the fulness of the expansive; since no one particle can move, without pushing others out of the way. And that there is such a quick and universal motion all thro' the expansive in every direction, appears from the motion of light. Let a person be placed any where in the open expansive, he may look

around him and see objects every way: now this could not be, unless there were particles of light in motion from every visible point to his eye: and 'tis much the same wherever his eye be placed. And if there be in nature such an universal and continual commotion of contiguous particles, 'tis evident from hence, that the particles can be stop'd in their motion in no one part of the heav'ns, without making some proportional stoppage all around; neither can any of these particles be put out of their course, to move in any other direction, without having some suitable influence upon the surrounding contiguous particles. This thought will of itself give some light into the cause of gravitation.

For let two resisting bodies be supposed to be placed any where in this commotion near one another, it is now evident that there is less of the free motion of the expanse between them, than elsewhere; consequently the free motions of the expanse around (being stronger than the motions of the particles between) will of course impel these two bodies towards one another, with a force equal to the difference between the strength of the motions around these two bodies, and those in the intermediate space.

Again, 2. This universal and constant commotion must produce an universal *compression*, since in their motions they press against each other mutually. This compression

sion will drive the atoms into masses in many cases. And these opposite pressures nearly ballance each other. From hence likewife it follows, that if the pressure be stopped or retarded, or taken off in one direction more than in another, there will be a prevailing pressure of the celestial æther more one way than another. This again accounts for gravitation in another light or view : for a resisting body, such as is the globe of the earth, takes off the pressure in some considerable degree : for where such a body is not near, there the pressure one way destroys the pressure the contrary way ; but by this intervening body, there cannot be that pressure from the body outward, as there otherwise would be, were it out of the way ; and therefore there must be a prevailing pressure and tendency of the æther towards it. Again,

3. This universal compressure, produces a constant *expansion* or *elasticity*. To illustrate this, let me direct you to fix your thought upon any particular spot or space in the free expanse : and then you must conceive that the æther in this spot is either *finer* or *grosser*, than or upon an equality with the contiguous surrounding æther. If it be *finer* in this spot, the surrounding grosser æther is pressing in to expand it, and make it grosser ; if it be *grosser* in this spot, the surrounding finer æther is pressing in to expand it, and make it finer ; the reason is, because the continual

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commotion and pressure attempt to keep an equilibrium. If the spot you fix your thought upon be exactly as fine, or exactly as gross as the surrounding æther, it then remains in its present condition; but is always ready to become groffer or finer, to be more expanded or compressed, as occasion may require. This I conceive is the very Idea we have of elasticity. Since then you can fix your thought upon no spot in the free and open expanse without conceiving it as properly elastic or expansive; the case then is the same, as if every point in the space were occupied by a particle of matter, which is elastic in its nature.

'Tis true, that the supposition of infinitely small particles elastic in their nature, is very erroneous and unphilosophical, since it can never be regularly conceiv'd or explain'd. But yet computations made upon that erroneous supposition, will be mathematically just and exact, because of the universal expansive force. Observe therefore, that Mr. *Colden* has argued and computed upon this supposition, and has I think proved that it will account for the phænomena of gravitation; I therefore freely leave him to make this matter out clearly to you, and am thankful to him for the assistance he has giv'n to this part of my subject. Again,

4. There is likewise arising from all this an universal *friction* as well as *compression*: the latter compresses the atoms into masses, the

the former dissolves the masses into atoms again ; and there is no part of the heav'ns where there is not something of both, tho' in some places and cases the *friction* prevails, in other cases the *compression* prevails. From hence it follows that you cannot fix your thought upon any spot in the expanse, but you in your mind see, that if that spot has a number of atoms in it, those will soon be compress'd into masses, and if the spot has a number of masses those will soon be dissolved into atoms by the friction ; by which means and by the perpetual motion in the expanse, it comes to pass, that the cælestial æther composes not only a universal elasticity, but an elasticity in constant agitation : both which join'd together, Mr. *Colden* proves, will produce a gravitation towards a resisting body reciprocal to the squares of the distances from it. Once more,

5. From all this arises an universal *struggle*, or a continual attempt to return to its natural situation, whenever it is prevented or hinder'd in the freeness of its motion.

This continual struggle finishes the whole, and makes the expanse appear properly suited to perform the work assign'd it. My meaning here is plainly this ; if by any means whatever, the æther be made either finer or grosser, than it is in itself by the constant influx and eflux of light and spirit ; or if it be hinder'd or accelerated in any of its mo-

L tions,

tions, it constantly struggles in order to regain its natural situation. That this must be the case, I think is undeniably clear from the description giv'n of it. And from hence we may learn the nature of its agency both in producing gravitation and cohesion, and in continuing a motion once imprest.

Is it retarded in its motions by a resisting body ? it therefore continually strives to recover itself ; and in this attempt it produces a gravitation towards that place where 'tis most retarded, which is at the surface of the resisting body.

Again, Is the æther finer in the pores of bodies than elsewhere ? it therefore strives to push in to those finer parts, and so causes *cohesion* : And once more, is the æther made finer behind a body than before it by our putting it into a sudden motion ; it therefore, by striving to restore the equilibrium, makes an impulse behind, and perpetuates the motion.

Upon the whole then, the expanse upon this view of it appears to be a glorious agent, in perpetual activity : acting constantly and powerfully upon itself, and upon all other matter, and must therefore be esteem'd the great mechanical cause in all natural operations. And we need not doubt of its suitableness and sufficiency for all its work, under the divine superintendence, since it has in it as proper a fulness of matter, as is consistent with its motion : since it has a universal *commotion*,

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compressure, and *expansion* in it; join'd with a power, not only of receiving any impressions made upon it, but likewise of communicating any impression it receives in any part, to all the surrounding parts, in a proper regular proportion. The *commotion*, the *compression*, the *friction* and the *expansion* in the heav'ns are properly universal and perpetual; being more or less in all the parts of nature: while the struggle and attempt to restore itself is always in those parts where its motions are retarded or accelerated; and this impression made upon it, or alteration made in it, will necessarily communicate itself to the surrounding æther.

The subject is put in these various lights, not to confound the reader, but that he may conceive of it in *one* view, if he cannot so readily comprehend it in *another*.

Upon the whole, I hope it is now evident, that an universal elasticity or expansion, prevented in its motions by a resisting body, must produce a gravitation towards that body: And that this gravitation in general is reciprocal to the squares of the distances, is in my opinion, very ingeniously and sufficiently proved by Mr. Colden.

I am very sensible that the great Sir Isaac Newton and his followers have a standing objection against all this scheme. For they say, If space be full of matter, the fluid composed

of such a fulness, must be exceedingly dense, and therefore must resist or prevent any motion of a body in it as much as the dense fluid of quicksilver does, and more too. This difficulty I shall solve in the words of Mr. *Colden*, page 26. Who says, " all the parts of the " æther are contiguous, and no void space " between them, except where their place is " filled up with resisting matter ; and if so " there can be no vacuum. Sir *Isaac Newton* and his followers, on the contrary, " think there must be a vacuum, and their " reason is, that all matter has the *vis inertiae* or force of resisting. If it were so, " then the supposition of a vacuum becomes " absolutely necessary ; for without it there " could be no motion. But if it be true, as I " think I have proved, that there are different species of matter, and that only one " species has the power of resistance ; and " that this (as will appear by the least reflection) is by far the least part of the universe, all the difficulties, as to motion, on " supposition of space being every where " full, vanish."

Thus then the substance of what Mr. *Colden* asserts is regularly and mechanically explain'd by the principles of revelation : and his thoughts upon philosophy are found to be an unexpected and undesign'd confirmation of the philosophy of scripture.

By

By these general hints the reader will, I hope, see the evidence with which these inferences are drawn from the scripture expanse, and will perceive how these effects are justly ascribed to it; without the trouble of an exact, minute, mathematical demonstration of each particular. This trouble has been purposely avoided, in order to render the subject more easy and familiar to every reader: not as if I was afraid to bring these things to the mathematical test, nor as if the subject before us was incapable of a mathematical demonstration: far from it; for the very reverse is true: so far from it, that nothing is more desirable, than that the indubitable principles of mechanism and the mathematics should be set on work upon the data of revelation; to explain the general cause, to investigate the necessary consequences, and to apply them to particular effects. Such an attempt, if regularly managed and assiduously pursued, would illustrate each property of the expanse, and would open such a scene of inferences and enquiries, as would demonstrate the compleat exactness of the works of nature, and show the perfect correspondence of the word of revelation thereunto.

Until therefore any *essential* parts of this scheme be fairly overturn'd, or any *essential* evidences for it disproved; not by the general opinion

150 APPENDIX.

opinion or probable conjecture, but by solid inferences from reason, scripture or experiment; this treatise, with all its imperfections or *circumstantial* mistakes, may be deem'd a standing evidence in favour of revelation, confirming its divine authority, and displaying the exactness and excellency of the account it gives of the works of nature.

FINIS.

10 AP60

THE
EXPLANATION
OF THE
COPPER PLATE.

THE large circle and its contents, which fill up the body of the plate, represent THE WHOLE SYSTEM OF NATURE, At the center A you have the SOLAR FIRE, call'd in the Hebrew 'HeReS, see p. 58. You have in the next place a clear brightness B, which surrounds the solar fire, call'd in scripture the 'HaMaH or EXTREME HEAT, at the surface of the sun's body, see p. 57. Next without this is the orbit of the planet MERCURY, at C, and then the orbit of the planet VENUS at D. The circle above that is the EARTH'S ORBIT, where E is the globe of the EARTH, call'd in Hebrew AReTS. The circle surrounding the earth represents the MOON'S ORBIT. The enlighten'd part of the moon, or the WHTIE OF THE MOON, which is visible to us, is call'd in Hebrew LibNaH, see p. 57. while the light which is reflected from it to the earth is call'd YaRa'H, see p. 46. The circle next above, or beyond the orbit of the earth, is the orbit of the planet MARS at F. The circle next beyond, which surrounds the sun, is the orbit of JUPITER at G, and the four little circles around the body of

2 The explanation of the copper plate.

Jupiter represent his satellites in their several orbits surrounding and attending the planet Jupiter. The planet that is furthest off from the sun is SATURN at H, where the large circle represents its orbit round the sun, and the five lesser circles around the body of Saturn represent the orbits of his five moons, which surround and attend that planet. It will be proper here to observe, that these several orbits are placed one without the other, at such distances as represent the proportions of their distances from the sun, as computed by the present philosophers. But the distance from the orbit of *Saturn* to the fix'd stars, being not as yet positively ascertain'd, cannot be so exactly represented to the eye in this plate; and 'tis probable that the proportional distance from *Saturn's* orbit to the stars is much greater than can be conveniently represented in a copper plate.

In this place 'tis likewise proper to take notice how the number and fize of the black strokes and *dots* gradually increase towards the circumference, and decrease towards the center. These strokes and *dots* represent the SPIRIT call'd in Hebrew RUa'H, or grosser parts of the heav'n, see p. 37. And the bright, clear intervals between them represent the LIGHT call'd in scripture AOR, see p. 40. And this representation exactly tallies with the scripture account: for according to the plan of revelation the light gradually decreases towards

the circumference and increases towards the center; on the contrary the *spirit* gradually increases towards the circumference, to the fix'd stars, and beyond to the very extremity of nature, and decreases gradually towards the center.

The *spirit* represented by the black strokes and dots is continually in motion towards the center, and the light represented by the white ground is as constantly in motion from the center towards the circumference. By these opposite motions they are constantly conflicting with each other, the *light* dissolving the *spirit* into atoms, and the *spirit* condensing the *light* into masses mutually. The *light* and *spirit* being thus in continual conflict, compose the SKIES or *conflicting æthers*, call'd in Hebrew SHa'HaKIM. See p. 73. The friction of these two against each other, whereby the *spirit* is dissolved into *light* is the FIRE. See p. 60. Next within the extremity of the system you will see at I a circle of fix'd stars, call'd in Hebrew RoASH COCaBIM, see p. 59. THE HEAD OF THE STELLAR FLUXES; while the fluxes of light from them are call'd COCa-BIM. See p. 46.

The fix'd stars themselves are at too great a distance for us to learn with any certainty by observation, what they are, or what use they are of in nature. To suppose that they are suns to so many other systems, may be a pleasing imagination; but no experiment or

4 The explanation of the copper plate.

observation can ascertain the supposition. However 'tis evident they are either strong reflectors, at the verge of nature, placed there to prevent the spirit from being too much condensed to carry on the operations of nature; or else they are luminous bodies of themselves. But if so, it does not necessarily follow from hence that they are suns to other systems, or that they are capable to dissolve the spirit into light, to such a degree as the sun itself does; for every one knows that a body may be capable of putting the surrounding æther into a great degree of illumination, without having much heat or fire in itself, as is the case of a common lamp or candle, while there may be a great degree of heat, and but little visible light produced.

At the very extremity of nature K is the DENSITY, call'd in Hebrew GNAB, see p. 61, where the spirit is exceedingly dark and condensed into an immoveable solid; and this is the boundary of nature. If the fix'd stars are only reflectors of light they touch the density, but if they are luminous bodies, 'tis possible they may be at some little distance within it: but which soever of these two they are, 'tis likely they are serviceable in nature to prevent a too great or too speedy condensation of the spirit into an entire density.

Besides this large circle, which comprehends the glorious system of nature; there are

The explanation of the copper plate. 5

are in the plate four lesser circular figures, all which respect the globe of the EARTH, and are design'd to set forth the various conditions the earth was in on the first four days of the creation.

Fig. I. *The condition of the earth on the FIRST day of creation:* when the matter of the earth was in a concave sphere of loose atoms, a chaotic mixture of the earth and waters together, p. 107. represented by B. and the heav'ns, in a state of darknes, was both within and around this concave sphere, see p. 108. The darkness around is at A 1. the darkness within at A 2.

Fig. II. *The condition of the earthly globe on the SECOND day of creation:* when the darkness both within and without was form'd into a firmament or expansion; and had operated upon the confused fluid mass to separate the earth from the waters, see p. 109. The expansion without the chaotic mass, C 1, had separated the earthy from the watry parts on the outward surface of the chaotic mass, which waters lay upon the outward surface represented by D 1, call'd *the waters under the firmament*, because next below the outward expans. The expansion within C 2, had separated the earthy from the watry parts on the inner surface of the chaotic mass; which waters D 2, lay next above the internal expansion, called for that reasen *the waters above the firmament*: and consequently the crust of earth E was between the wa-
ters;

6 *The explanation of the copper plate.*

ters; and thus the expansion divided between the waters above and below the firmament, by forming the intervening crust of earth.

Fig. III. *The condition of the earthly globe on the THIRD day of creation:* when the waters without, which covered the earth, rushed in, thro' cracks and fissures, into the center; and the airs within rushed out; and so the dry land appear'd, see p. 111, Where F represents the airs in expansion surrounding the earth, as on the second day: G the airs in expansion, which rushed out of the earth, and have now taken place of the waters, which covered the earth on the foregoing day. H is the crust of earth: I represents the waters which were above the expanse on the foregoing day; and K represents the waters which before cover'd the earth, but are now gone into the bowels of the earth, and have taken place of the internal expanse. Both these waters now united together in the bowels of the earth, are call'd the *abyss* or *great deep*. L represents a small circle of earth, which may be call'd the *inner globe*; being no other than those earthy parts which must be supposed to be broken off from the crust of the earth by the violent rushing out of the internal airs, and rushing in of the external waters; which earthy parts must naturally subside at the center of the earth. M represents any sea or ocean that has a communication with the abyss. n, n, n represent

the

The explanation of the copper plate. 7

the more narrow and oblique fissures, thro' which the air ascended at first, and thro' which perhaps vapours and springs of water now ascend to form rivers, which run into the sea, and by that way return to the deep, from whence they are extracted: according to *Eccles. i. 7. All the rivers run into the sea, yet the sea is not full; unto the place from whence the rivers come, thither they return again.*

Fig. IV. *The position of the earth on the FOURTH day of creation;* when God ordain'd the luminaries to rule over the day and night upon the earth, and set them for signs and seasons, for days and years. Where you have the earth with that face presented to you, upon which the sun shone full at the first setting out of computed time. At this instant the sun not only made an equal division between light and darkness; for that it always does, since one half of the globe is constantly enlighten'd, and the other half unenlighten'd; but it made likewise an equal division between day and night; so that the sun was in an equinoctial point; and many circumstances concur to direct us to the autumnal equinox, when the solar light begins to go towards the south, and afterwards turns about to the north, see p. 53, 54. In this figure, A is the north pole, B the south pole; consequently the line A B is the axis of the earth: here you see the north leaning aside, according to p. 123. C D is the ecliptic line;

8 The explanation of the copper plate.

line; E F the equinoctial line; and G the first point of *Libra*, where the sun is at the autumnal equinox. This position is very remarkable, and is a beautiful speculation: 'tis a position the properest imaginable to begin all computation of time from; For the autumnal equinoctial point *Libra* is placed in the first meridian, as the sun shines perpendicularly upon it; so that in this first instant of the first year, the sun, with respect to the earth, had no *right ascension* or *longitude*, being actually upon the first meridian in the properest sense: it had no *latitude* or north or south *declination*, being in the equator: it had likewise no *azimuth*, being full south with respect to the first meridian; neither had it any *amplitude*, either as to its rising or setting, since 'twas an equinoctial day, wherein the sun rises exactly in the east and sets in the west. Add to all this, that on this day, and at this instant, the north pole lean'd aside, full east, the very way in which the earth proceeds in its annual orbit; and by an angle of twenty three degrees and a half, the very angle, which the ecliptic forms with the equator: yea farther, the ecliptic line upon the earth exactly coincided with the plane of its orbit, the very path which it takes in the heavens. From this moment *latitude* and *longitude*, *azimuth* and *amplitude*, and all actually commenced, since they all began to be form'd or produced by means of the annual and diurnal motions of the earth.

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Fig: I.

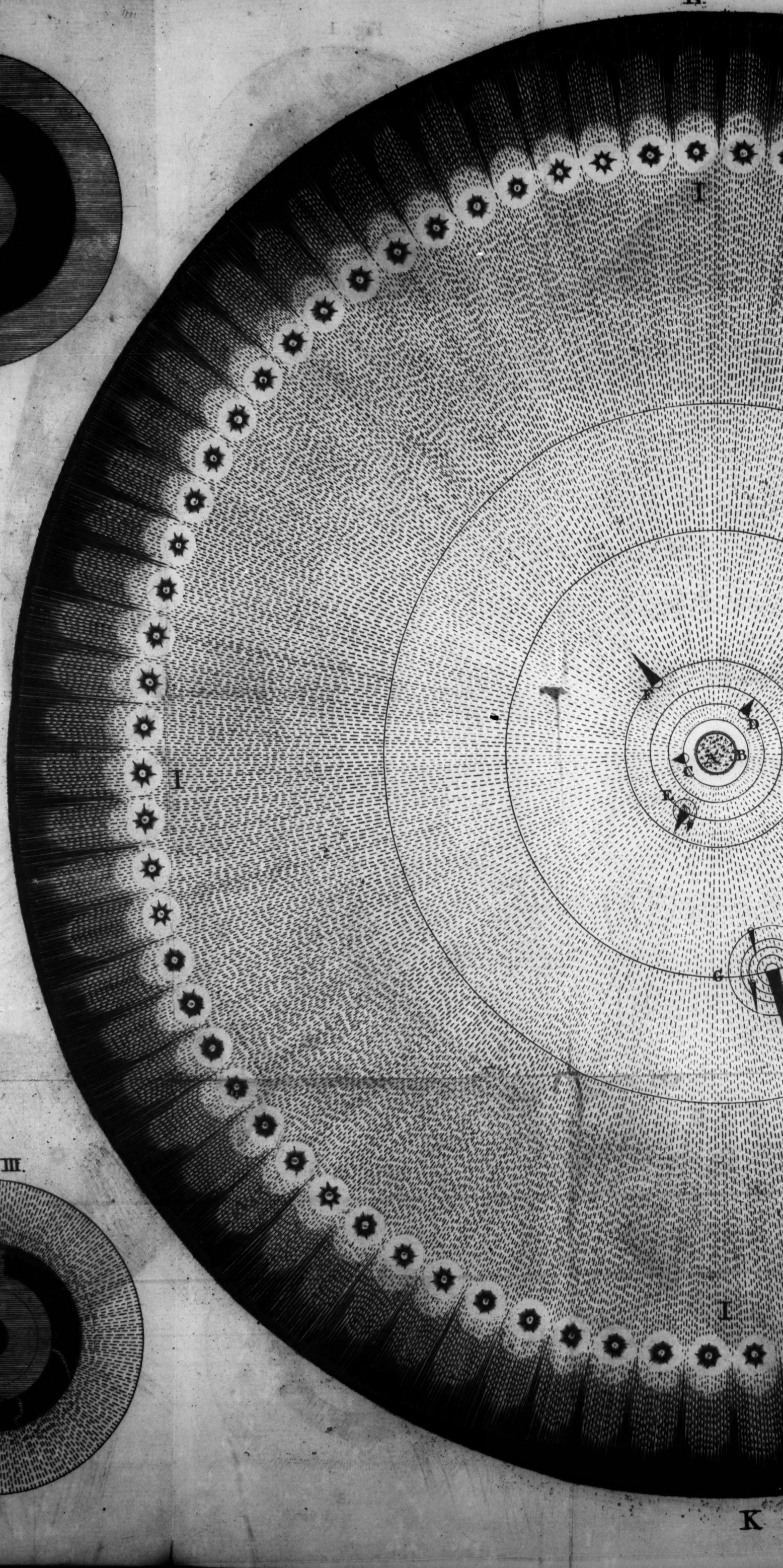
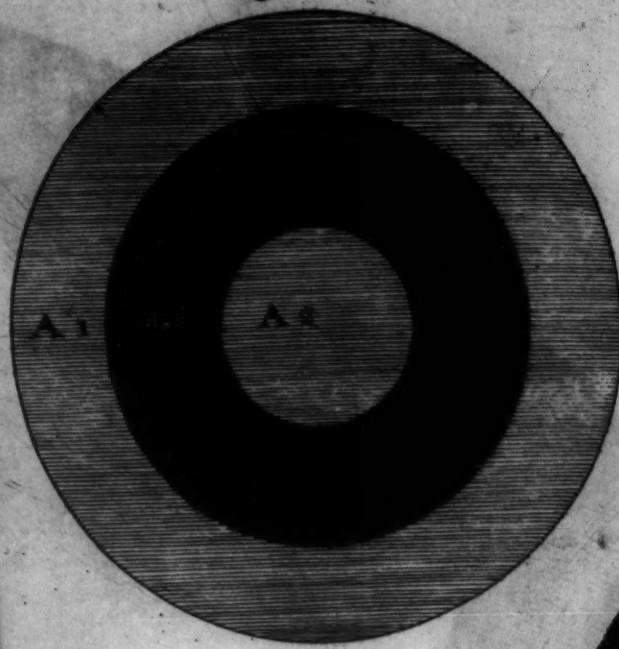
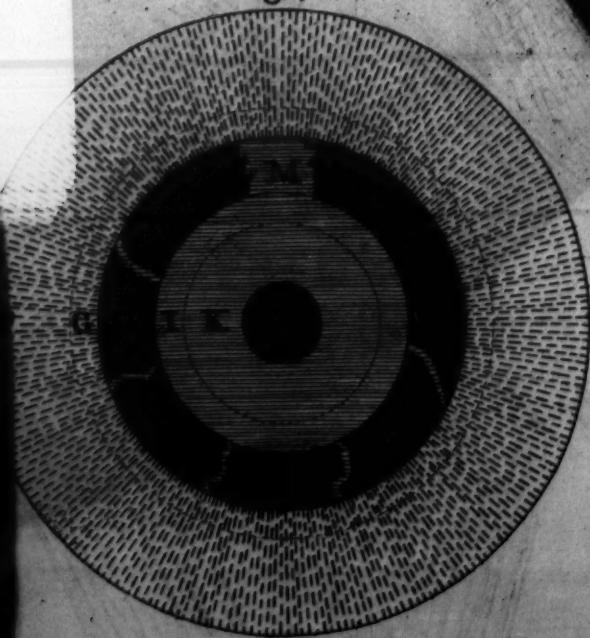


Fig: III.



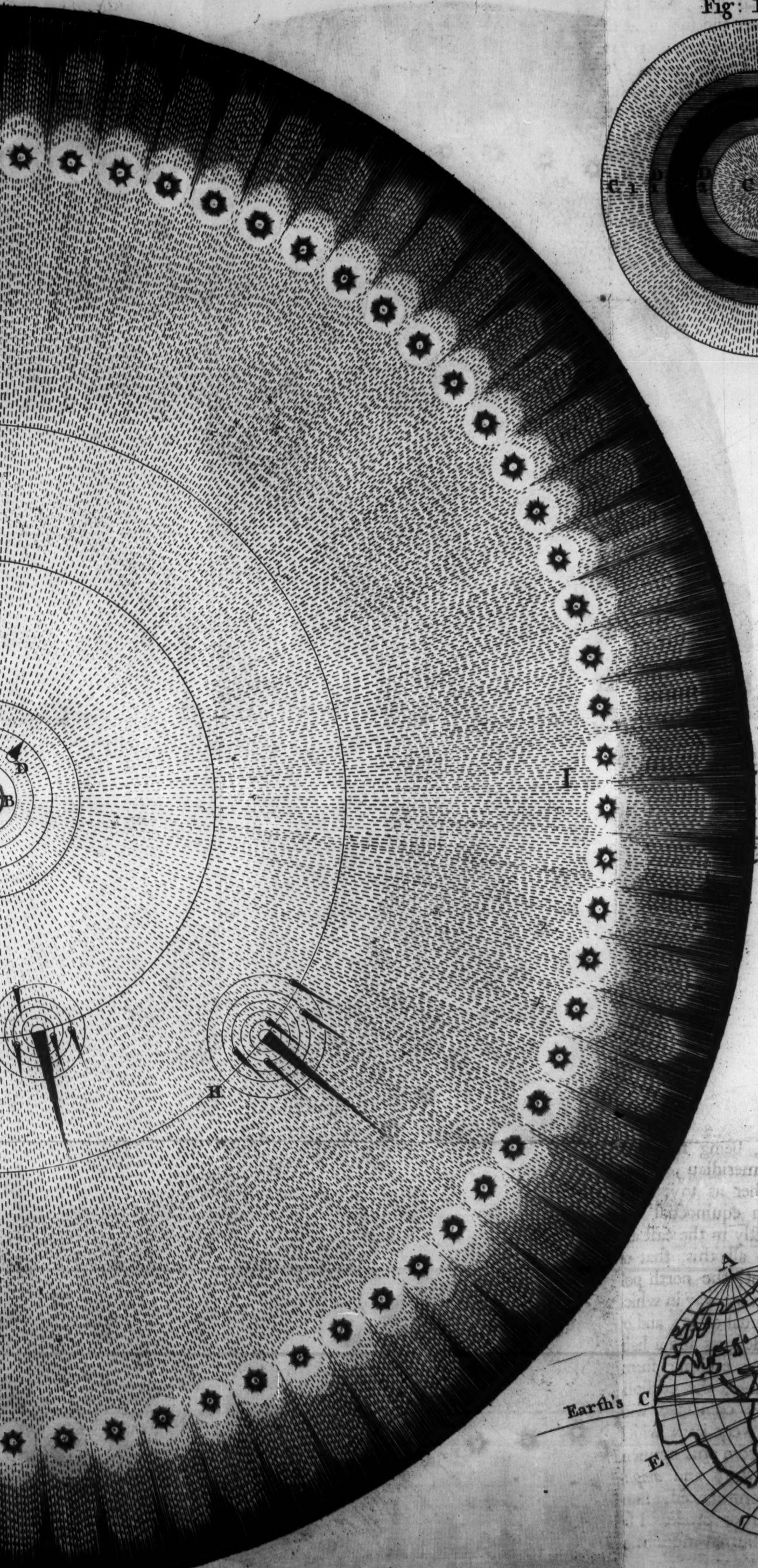
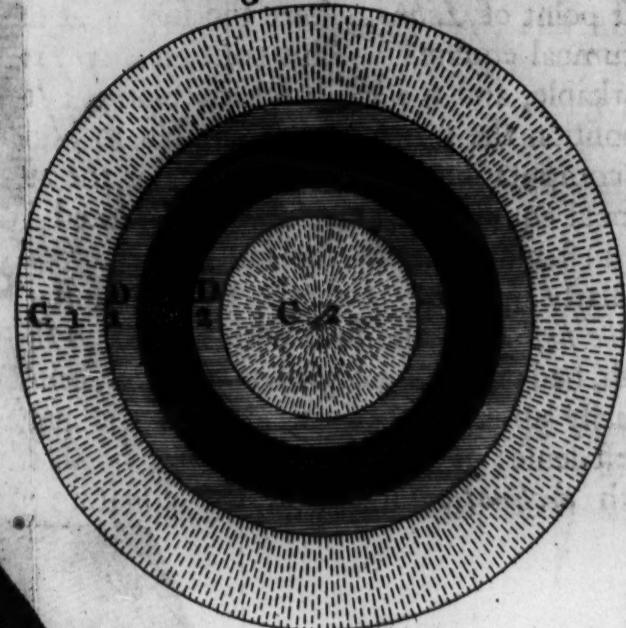


Fig: II.



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Fig. IV.

